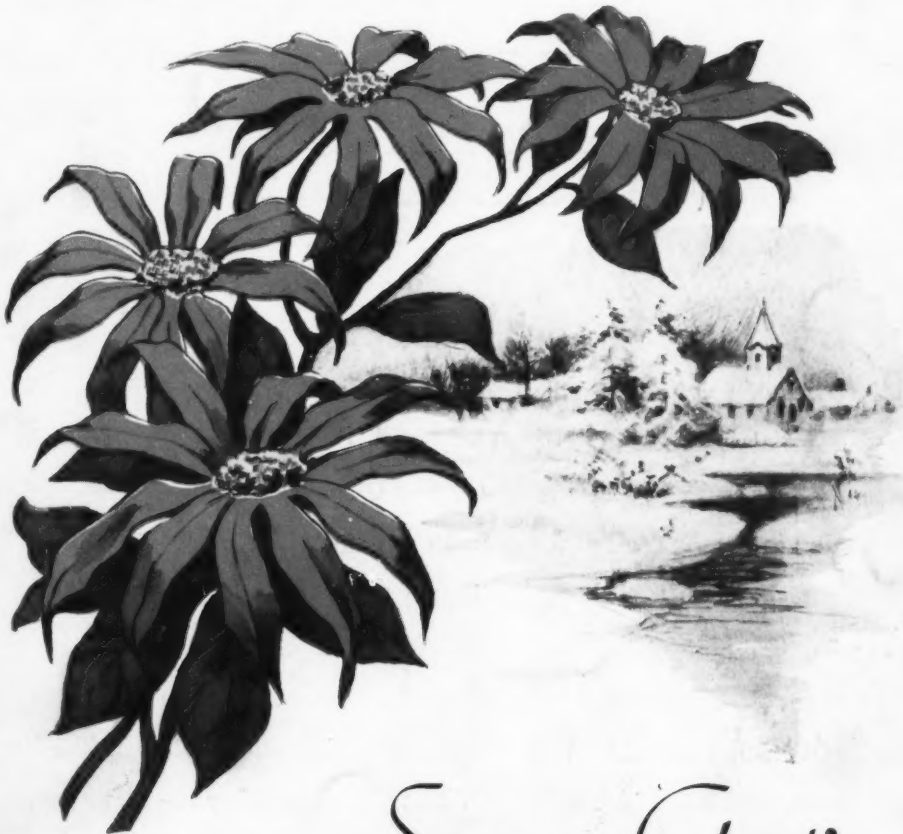
306.8
Am3
P837

AMERICAN DYESTUFF REPORTER

LIBRARY
RECEIVED
JAN 4 1938
U. S. Department of Agriculture

DEVOTED TO THE INTERESTS OF TEXTILE CHEMISTRY
BLEACHING ◆ DYEING ◆ FINISHING ◆ PRINTING

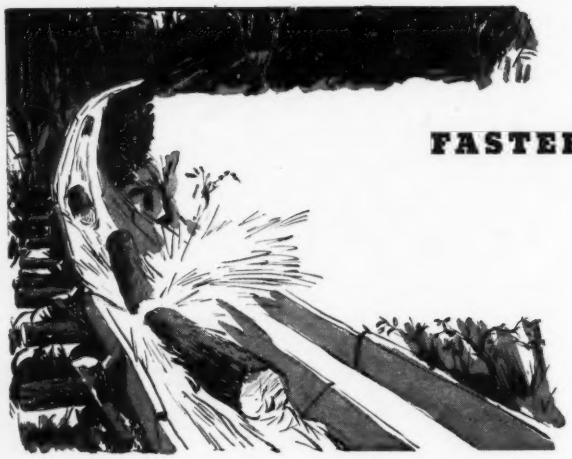
VOLUME 26 | DECEMBER 27, 1937 | NUMBER 26



Courtesy of J. R. Brundage, Inc.

Seasons Greetings
Geigy Company Inc.
Dyestuff Makers Since 1859

OFFICIAL PUBLICATION OF THE AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS



FASTER WAYS TO REACH NEW MARKETS

SULPHONATED OILS

Rounding out a comprehensive chemical service to the textile industry, Cyanamid offers a full variety of sulphonated oils and efficient technical assistance in their selection and use. Our staff will give you expert cooperation in determining those best suited to your individual needs.

Cyanamid offers the same individual cooperation in the use of its complete line of **SIZING COMPOUNDS, PENETRANTS, WETTING AGENTS, ACIDS, ALKALIES, HEAVY CHEMICALS, DYEWOOD EXTRACTS, TAPIOCA FLOUR, SAGO FLOUR, GUMS, WAXES, WOOL GREASE, PIGMENTS AND FILLERS** and other materials for textile processing.

In addition to its own full line of Textile Specialties, Cyanamid also continues the sale of those of the former Chas. H. Stone, Inc., and H. A. Metz & Co., Inc., including the well known "Victoria" line of oils and softeners.

AMERICAN CYANAMID & CHEMICAL CORPORATION

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

A. P. HOWES
Publisher

M. D. REESER
Advertising Manager

AMERICAN DYESTUFF REPORTER

LOUIS A. OLNEY
Directing Editor

NORMAN A. JOHNSON
Managing Editor

Copyrighted 1937 by Howes Publishing Co.

DEVOTED TO THE INTERESTS OF TEXTILE CHEMISTRY
• BLEACHING • DYEING • FINISHING • PRINTING •
AND THE NECESSARY MECHANICAL EQUIPMENT

"Circulated Everywhere Textiles Are Processed"

Subscription Price: $5.00 per year; Canadian, $6.00; Foreign, $6.00. Fifty cents per copy

VOLUME 26 | DECEMBER 27, 1937 | NUMBER 26

CONTENTS OF THIS ISSUE

Contents of previous issues can be found by consulting the Industrial Arts Index at your library

General

A New Series of Aliphatic Sulfo-Dicarboxylic Acid Wetting Agents 825
H. W. Rose
Fireproofing Rayon Fabrics 827
H. Roche
Recent Developments in the Production of Artificial Wool 829
Index to Volume 26—Follows page P838
Some Causes of Irregular Shades in Hand Block Printing 848
T. C. Hutchins
Trade Notes—New Products 850

Proceedings of
American Association of Textile Chemists and Colorists

Meeting, Northern New England Section P831
Modern Views of pH Measurement P832
G. A. Perley
Lanital and Synthetic Wools P837
C. Scholer
Official Opening, Seventeenth Annual Meeting P838
One Hundred and Fourteenth Council Meeting P843
Applicants for Membership P844
One Hundred and Seventh Meeting of the Research Committee P846
Meeting, New York Section P846

Official Publication of the American Association of Textile Chemists and Colorists

THE OBJECTS OF THIS ASSOCIATION ARE:

"To promote increase of knowledge of the application of dyes and chemicals in the Textile Industry.

"To encourage in any practicable way research work on chemical processes and materials of importance to the Textile Industry.

"To establish for the members channels by which the interchange of professional knowledge among them may be increased."

Published Every Other Monday

HOWES PUBLISHING CO. ~ ~ 440 FOURTH AVE. ~ ~ NEW YORK

CLOSING DATE FOR ADVERTISING COPY: MONDAY PRECEDING ISSUANCE DATE

KEEP Two Jumps AHEAD

with Calcomine Yellow Brown K Extra

It's easy to keep two jumps ahead when you use Calco Dyes. They make production run more smoothly and bring added economies to your dyeing operations.

Calcomine Yellow Brown K Extra is a worthy descendant of a long line of Azo forebears and is a splendid example of the improvements in quality which can be made when intermediates that are virtually chemically pure are combined with careful workmanship to produce a dyestuff.

Calcomine Yellow Brown K Extra possesses excellent solubility and leveling properties and will prove to be the most economical base for brown and mode shades. Aftertreatment with copper, chrome, and acetic acid reddens the shade but greatly increases the fastness to light and washing.

CALCO DYES ARE BETTER BUYS

THE CALCO CHEMICAL COMPANY, INC. · BOUND BROOK, NEW JERSEY

Calco

A DIVISION OF AMERICAN CYANAMID CO.

BOSTON · PHILADELPHIA · PROVIDENCE · NEW YORK · CHARLOTTE · CHICAGO · PATERSON

AMERICAN
DYESTUFF REPORTER

VOLUME 26 DECEMBER 27, 1937 NUMBER 26

A New Series of Aliphatic Sulfo - Dicarboxylic Acid

Wetting Agents

H. W. ROSE*

MODERN textile wet processing has changed considerably during the past few years. The changes brought about in our social and political economy have, no doubt, been influenced at least in part by the rapid technological advances of the past few decades. Without arguing the correctness of this hypothesis, it is nevertheless readily apparent to all those engaged in textile processing that such political and social upheavals over the old order of things that have produced such new concepts as the Wagner Labor Relations Act, Social Security legislation and Minimum Wage and Maximum Hour laws have had their counterpart in such technical advances in the textile industry as to represent a far cry from the "horse and buggy" stage of the industry.

New fibers have come into being. New and permanent types of finishes for the old fibers are the order of the day. New machines and improved equipment of all types have rendered obsolete even machinery of comparatively recent vintage. With all these changes, the chemical and dyestuff manufacturers have kept pace; in fact, have even headed the parade.

Our conception of such a common everyday chemical as water has changed. The idea now generally held is that water by itself is not such a good wetting medium as once commonly supposed. New methods and modern ideas have even tended to render water obsolete as a wetting agent.

Hence it is that "wetter water" is now being commonly employed as an essential requirement of modern textile processing. Wetting assistants are now accepted as being essential to equip water with the necessary power to do its job as the cheapest, most common chemical which we employ in textile wet processing.

The sulfated fatty alcohols represented a marked advance over sulfonated oils with their ever present troublesome free carboxyl groups. Now there are available further more modern tools for the production of "wetter water".

*American Cyanamid & Chemical Corp.

In U. S. Patent 2,028,091, there is disclosed a new series of esters of aliphatic sulfodicarboxylic acids. "Esters of sulfo saturated and unsaturated aliphatic dicarboxylic acids such as, for example, mono and disulfosuccinic, sulfochlorsuccinic, sulfoadipic, sulfopyrotartaric, sulfoglutaric, sulfosuberic, sulfosebacic, sulfomaelic, sulfofumaric, sulfodimethylsuccinic, sulfomethylglutaric, sulfopomelinic, sulfoprypylsuccinic, sulfooctylglutaric, and other sulfonated dicarboxylic acids of the aliphatic series have never been prepared hitherto."

"The esters may be prepared by esterifying the sulfo acids, which acids may be prepared either by sulfonating the unsulfonated saturated acid or by adding a sulfite or bisulfite to the corresponding unsaturated acid or its salts. Another method of producing the sulfo acid is to treat the halogenated saturated acid with an alkali sulfite preferably under pressure.

"While the present invention in its broad aspects of new esters as new chemical compounds is not concerned with the particular method by which the esters are prepared, in a more specific aspect an improved process of comparing the esters is included. This process consists in esterifying the corresponding unsaturated acid and adding a bisulfite to the ester. This process presents marked advantages over the alternative process of esterifying the already prepared slufo acid, since the unsaturated acid is practically in all cases more easily esterified and in the form of the ester can be readily purified where it is desired to produce a relatively pure product from a crude unsaturated acid."

"The esters of the sulfoaliphatic dicarboxylic acids are of the most various types. Thus, for example, esters of low molecular alcohols such as methyl and ethyl and propyl alcohols, are very soluble in water in the form of their metal salts, and form excellent detergents. Esters of higher molecular alcohols show increasing powers as wetting agents, but in general with a decreasing solubility in water in the form of their alkali metal salts. Thus the butyl esters show considerable increased wetting powers over the propyl ester and the diamyl esters show extra-

ordinarily high wetting powers and still have excellent solubility in water. These amyl esters may be single esters such as normal amyl, isoamyl, or secondary amyl esters; or mixed amyl esters may be obtained by esterifying with the mixture of amyl alcohols obtained by the hydrolysis of halogenated pentane fraction of natural gas."

A few examples from the patent will be sufficient to illustrate the various processes employed in producing these esters.

Example 1

"1 mol. of sulfomaleic acid in the form of its monosidium or potassium salt is distilled with 4-5 mols. of methyl alcohol, a small amount of sulfuric acid being added as an esterification catalyst. The distillate is fractionated under a reflux, water or aqueous methyl alcohol is withdrawn from the system from the bottom of the fractionating column and the operation is continued until a conversion of 95 per cent or higher is obtained. The mixture is then neutralized with caustic soda or, if desired, with sodium carbonate and the excess alcohol is recovered by distillation. The residual aqueous solution is evaporated to dryness and forms a white, rubbery acid having no definite melting point and showing a very great solubility in water. The product is the sodium or potassium salt of dimethyl sulfomaleate."

Example 2

"1 mol. of normal diamyl maleate having a boiling point from 146 to 148° C. at 2 mms. is mixed with 1.05 mols. of sodium bisulfite and the whole agitated at 100° C. with water in the proportion of 100 parts by weight of water to 256 parts by weight of diamyl maleate. Preferably the agitation is carried out under slight pressure to avoid loss of SO_2 and is continued until a sample is completely soluble in water. The mixture is dried and if required, freed from inorganic salts by dissolving in an organic solvent such as benzene, filtering and evaporating the benzene. The product, which is diamyl sulfosuccinate, is a transparent soapy solid which can be ground with some difficulty to a white powder. It is very soluble in water, benzol, alcohol or gasoline. It is a wetting agent of great power and an excellent detergent particularly because its calcium salt shows almost as much solubility as the sodium salt."

Example 3

"340 parts of dioctyl fumarate (boiling point 180 to 190° C. at 4 mms.) is prepared by the esterification of fumaric acid with 2 ethyl hexanol and is mixed with 109 parts of sodium bisulfite and sufficient water to form a 50 per cent solution. The addition of sodium bisulfite is carried out as described in Example 2 and the product purified in the same way. The resulting sodium salt of dioctyl sulfosuccinate is a transparent rubbery mass which cannot be ground to a powder. It is soluble in water and the common organic solvents, and shows a wetting power even greater than the diamyl sulfosuccinate.

"Instead of recovering the dioctyl sulfosuccinate as described in Example 2, it may be salted out by any suitable salt such as sodium chloride or sodium sulfate. Some of the salt may be precipitated or retained by the dioctyl succinate and this is unobjectionable since the addition of a certain amount of salt increases the wetting power of this ester. The salt may have no wetting power itself or the salt of another wetting agent such as, for example, the sodium salt of isopropyl naphthalene sulfonic acid may be added. Such mixed wetting agents are very useful for certain purposes.

"The triethanol amine salt can be prepared by reacting with the triethanol amine hydrochloride and is likewise water soluble. Similarly salts can be prepared with pyridine, nicotine, or cinchona alkaloid."

These esters have two properties which render their use as wetting agents and detergents of particular importance. The first is the solubility of their calcium and magnesium salts which render them of great value in hard water. The second is their remarkable resistance to acid, in which respect they are superior to most other types of wetting agents.

These wetting agents find wide application in various fields in wet processing. Among these applications may be listed the following:

The wetting out of grey cotton piece goods prior to caustic boiling and subsequent chlorine bleaching.

Wetting out grey cotton piece goods prior to peroxide bleaching.

Mixing with animal and vegetable oils (previously sulfonated) to form a liquid soap possessing strong detergent properties, without affecting colors when used in conjunction with sodium or hydrogen peroxide in bleaching grey cotton piece goods containing vat dyed colored stripes.

Wetting out grey cotton piece goods on a mangle making same instantaneously and uniformly absorbent, which is necessary prior to grey sanforizing.

Mixing with sulfonated vegetable oils for the treatment of cotton (bleached or dyed) fabrics to increase penetration prior to sanforizing.

Adding to the dye bath on grey cotton piece goods dyed direct from the bale to produce penetration and uniformity.

For the preparation of raw stock cotton, yarn and cotton piece goods prior to dyeing with all types of colors.

As an addition to the dye bath on all types of machines and all kinds of colors where increased penetration and uniformity of shade are otherwise difficult to accomplish.

As a dispersing agent in the dissolving of dyestuffs in order to give complete solubility and full color value.

For the preparation of grey cotton piece goods to be printed direct from the bale.

As an admixture to a printer's paste to give thorough penetration, greater color value, and increased fastness to soaping, especially on cotton piece goods printed direct from the bale.

As an admixture to vat color pastes where the process calls for pigment dyeing with subsequent reduction in the fiber or fabric.

De-oiling, or so-called "de-gumming", of raw stock cotton that has been dyed in the presence of sulfonated vegetable or animal oils which usually interferes with the

spinning qualities. This is done in the final bath after rinsing.

The treatment of cotton piece goods prior to shrunk finishing.

The treatment of cotton piece goods and the addition to starch pastes on absorbent finishes.

The treatment of water prior to the addition of dry starch. This insures absence of lumps, complete wetting and complete solubility on boiling.

For use either with or without soap in the after soaping of cotton yarns and fabrics.

In "brown souring" for obtaining better penetration of the acid and greater solubility of calcium and magnesium salts.

The oxidation of vat prints, for preventing over-oxidation in the Bichromate or Perborate baths, for increasing the efficiency of oxidation and for overcoming any harsh feel that may be left by Bichromate.

The desizing of Rayon or Acetate piece goods.

While the above uses cover only the wet processing of cotton, similar effective applications have been made in processing silk, Rayon and wool.

Such modern tools as the Deceresol Wetting Agents are enabling the textile industry to keep pace with the ever increasing demands for greater speed and more effective processing, and to assist in the production of the new types of fibers and fabrics characteristic of this streamlined age.

Fireproofing Rayon Fabrics*

Practical Hints on a Difficult Process

H. ROCHE

FOR more than a century, methods of fireproofing textile materials have been in use. Many of these methods have been applied to rayon fabrics, not always with complete success. In some cases the reagents used have a deleterious effect on the rayon fiber causing tendering to occur and in other cases the attractive appearance and handle of the cloth is ruined. In producing a fireproof finish on rayon, as in many other finishes, special care and knowledge is required.

This descriptive discussion of fireproof rayon fabrics will be of interest to all rayon finishers. Rayons used extensively in decorative fabrics are inflammable, and in the following article it will be seen that the aim of fireproofing is to cause the material to resist burning and to prevent the access of oxygen by the evolution of gases which inhibit combustion. Fireproofing may tender rayon or affect the handle or color. Many fireproof finishes are not fast to washing. A permanent finish is obtained by using sodium tungstate and tin chloride. A recent method suggests using cellulose esters. Non-inflammable rayon yarns can be produced by incorporating various metallic compounds in cellulose acetate and spinning as usual.

Among the commonest fireproofing compounds used are ammonium carbonate, ammonium chloride, ammonium phosphate, ammonium sulfate, borax, boric acid, and dibasic sodium phosphate. These compounds, while amongst the best known, all suffer from the disadvantage that although good fireproofing is obtained, the finish is not fast to washing due to the compounds being soluble in water.

For fireproof finishes of varying degrees of fastness to washing the following reagents are used: alum, aluminium acetate, sodium tungstate, aluminium tungstate, lead acetate, sodium aluminate, sodium stannate and zinc sulfate and sodium silicate.

Apart from acetate rayon, rayon fibers are as inflammable as those made from cotton and it is very necessary to have satisfactory methods of fireproofing. Rayon yarns are used to a great extent for light-weight dress goods, lingerie, household decoration, curtain, and wall hangings. To an increasing degree, rayon is being used in decorative fabrics for cinemas, and theatres including stage decoration. For these purposes it is important that the materials are non-inflammable.

The materials commonly used as fireproofing agents have various defects. Due to the type of substance used it frequently happens that development of acid in the fabric occurs. The ammonium salts used may decompose and ammonia is evolved. The substance remaining on the fiber becomes acid and tendering occurs. This is particularly liable to arise if the fabric is stored in a damp atmosphere. The generation of such acids as sulfuric acid and phosphoric acid on the fiber also leads to unevenness in dyed goods and unsuitable handle and luster. Frequently the substances used are hygroscopic and encourage the development of mildew. In this case efflorescent substances should be added. If the reagents used are concentrated, crystallization and powdering of the deposited salts occur. This affects the appearance of the goods and also gives unsatisfactory fireproofing.

In practice a combination of reagents is usually adopted. Not all such substances are suitable in every case and it is usually advisable to make preliminary tests as to suitabil-

*Silk Journal and Rayon World.

ity. It is impossible to finish silk and rayon fabrics in such a way that they are absolutely fire resistant. The aim of fireproofing is to offer resistance to burning for a short time by preventing the access of oxygen. This is accomplished by the evolution of gases which do not support combustion such as water vapor, carbon dioxide, ammonia or by producing a substance which fuses above a certain temperature and coats the fiber with a non-combustible layer and so checks the spread of the flames.

The substances used are in general soluble in water and are applied in the final bath after dyeing. This leads to complications. Special fast dyes must be used and if the fabric is dyed a delicate shade, there is a great risk of flattening the color, particularly if the reagent is slightly colored as many of them are.

Even when the agents used are reasonably fast to washing, continued dry-cleaning seriously impairs the fireproofing effect. The crystals deposited on the fabric are non-adhesive and the mechanical action of the liquid used in dry-cleaning loosens them and some are removed.

The treatment adopted depends on the type of cloth. In some cases a stiff finish is desirable. For the heavier types of fabric such as curtain cloths, which are filled, it is convenient to add the fireproofing agent to the filling. After dyeing the fabric is run through a solution of starch and other filling agents to which is added 3 per cent potash alum and one-half per cent potassium bitartrate. On mixing, these substances produce aluminium tartrate which has the advantage of being white and is therefore useful when pale shades have to be proofed. If the fabric is previously given a treatment in tannin solution, aluminium tannate is produced and is much faster to washing. However, the latter method can only be used with dark shades as the aluminium tannate is itself colored. The action of such proofing is to produce steam and carbon dioxide which replace the air originally entrapped in the fabric and aluminium oxide remains on the fibers as a coating which prevents them bursting into flames.

Similarly, with heavy cloths, a mixture of ammonium chloride and ammonium phosphate is used. Silk and rayon readily absorb these salts. The effect is increased if boric acid is also used, although this adds to the cost. Ammonium chloride is useful when mixed with other substances.

For lighter fabrics, particularly dress goods, impregnation in 5 per cent magnesium sulfate followed by drying on the stenter is sufficient for many purposes. Magnesium sulfate contains seven molecules of water and on heating, a comparatively large volume of steam is produced which temporarily prevents combustion. The handle of the goods is crisp which may be an advantage. A cheap method is to pad in a mixture of starch, ammonium sulfate and borax. Small amounts of boric acid and sodium phosphate may be added to obtain a better effect. The fabric must be dried at a low temperature and therefore a stenter and not drying tins should be used.

With dyed goods where there is any risk of the color running, the treatment can be carried out in the cold when borax and boric acid are used. This method is particularly suitable for theatre decorations.

When a fireproof finish which is fast to washing is required, it is necessary to precipitate an insoluble substance on the fabric. One such method is to steep in calcium chloride at 30 degrees centigrade, hydro-extract and then soak in 10 per cent sodium phosphate at 30 degrees centigrade. In this way a precipitate of calcium phosphate is obtained on the fiber and this is almost insoluble. A mixture of calcium, phosphate, borax and sodium silicate may be used. If an addition of dextrin is made, this tends to prevent the formation of crystals of calcium borate or calcium silicate and gives a softer handle.

A further method for rayon materials is to steep in sodium phosphate and dry. The fabric is then passed into aluminium acetate and allowed to air dry to allow for the formation of aluminum phosphate which only occurs slowly. The material must be finally dried at 75 degrees centrigrade. A final soaping process causes the formation of aluminium soaps which are resistant to washing. Aluminium silicate may also be used in which case the material is steeped first in aluminium sulfate and then in sodium silicate which precipitates the insoluble aluminium silicate on the fiber. Tin salts are also useful. The method used is to pad in sodium stannate and dry. The material is then treated with ammonium sulfate and dried again. Any loose salts which have not reacted are removed by washing.

The use of sodium tungstate is recognized as one of the best methods. The least expensive application of this compound is to soak the fabric in sodium tungstate and hydro-extract and dry. An improvement is obtained if this is followed by a treatment in a dilute solution of tin chloride, resulting in the formation of tin tungstate as a fine white precipitate. This compound acts by forming a vitreous coating round the fibers on heating. Only vat dyed fabric will withstand this process.

The salts of tungstic acid are very useful as fireproofing agents. The sodium salt is prepared from calcium tungstate. The latter is boiled with hydrochloric acid producing yellow insoluble tungstic acid which is melted with caustic soda and forms sodium tungstate. The aluminium and zinc salts are also used. Acetic acid and sodium nitrate are mixed in the one case with the sulfo-ricinate of aluminium and in the other with zinc acetate and ammonium chloride.

An effective proofing is obtained by a combination of the phosphate and nitrate processes. In this method, the fabric is steeped in 10 per cent sodium tungstate. It is again hydro-extracted and dried without rinsing. There is a tendency for the crystallization of acid tungstate to occur and it is advisable to add a small proportion of sodium phosphate to the tungstate bath.

A method recently suggested to reduce the inflammability of rayon materials is to impregnate them with an alkylolamine salt of an inorganic acid such as the halide.

the phosphate or the borate. When acetate rayon yarns are treated in such a manner, they may be used for covering electrical conductors.

Cellulose esters and ethers have also been suggested as fireproofing agents. These substances may be applied when dissolved in ethyl or amyl acetate, acetone or tetrachlormethane. The solution is diluted with methyl or ethyl alcohol, benzene or toluene. These organic liquids are inflammable but as they are also very volatile, they are removed during finishing operations.

Perhaps the ideal method would be to produce a non-inflammable rayon yarn. This has been carried out on a small scale with regard to acetate rayon. Ortho-tungstates and nickel borate together with magnesium ammonium ortho-phosphate, calcium ammonium di-meta phosphate and zinc ammonium ortho-phosphates are mixed with the spinning solution and after spinning are incorporated in the thread. Such a mixture results in the formation of non-combustible gases on heating and the substances remaining in the yarn are fusible below red-heat.

—— ♦ ♦ ——

Recent Developments in the Production of

Artificial Wool*

A New Protein Process

TWO most interesting processes for the production of artificial wool have come from Italy and Germany, countries whose policy is to be self-supporting and avoid the importation of wool.

The Lanital of Italy has received considerable attention in the technical press and the broad outline of its manufacture is well known—a solution of casein is coagulated in the form of filaments which are "hardened" by means of formaldehyde. Tests of the product revealed some serious disadvantages, existing particularly in the wet state, which would prevent its successful exploitation as a means of replacing wool but would nevertheless still permit of its being mixed with wool. There appears to have been no great use of the material, outside Italy, and even in the country of its origin attention is now being directed towards admixtures of viscose and casein, i. e., the casein is being added to the viscose solution before coagulation.

The Artilana of Germany is quite a new product and little is known of its properties. The method of manufacture appears to be on the lines of incorporating a suitable synthetic resin in the viscose solution, and coagulating the product into filaments which are then given a wave formation by mechanical means. It is not known whether Artilana has the true elasticity of wool but it is known that Lanital possesses high extensibility as distinct from true elasticity.

Much of our information on the character of the wool fiber is a result of the studies of Astbury whose work on this subject forms only part of his wider survey of proteins in general.

Astbury, Bailey & Chibnall describe in B.P. 467,704 how the globular proteins of Keratin (wool fiber) may be used for the production of artificial wool. The first stage in the process is to bring about "denaturation" of the protein; this is a term which requires a somewhat precise definition as its meaning has changed during the past ten years. Previously, practically all that was known was that native proteins dispersed in water as lyophil colloids could be changed to a form in which they were completely insoluble in water or dilute salt solutions; the redispersed denatured protein was found in the lyophobe condition. Denaturation always preceded coagulation or flocculation.

The X-ray interpretation of denaturation by Astbury, Bailey & Dickinson (loc. cit.) in connection with the seed globulins showed that a protein may pass through successive intermediate stages before reaching complete denaturation—a final fibrous stage analogous to β-keratin. The intermediate stages are referred to as "degenerate" whereas previously they too would have been regarded as "denaturated."

Degeneration and denaturation therefore imply a breakdown of the specific globular configuration with the unfolding of the polypeptide chains, leading to agglomeration into parallel bundles analogous to those found in β-keratin.

The term "degeneration" has a specific meaning, distinct from degradation which implies breakdown of the protein by strong acids, alkalies, etc., where the protein molecule suffers a chemical disruption through splitting of the acid and/or peptide bonds; in the case of degeneration and denaturation there is no chemical decomposition, apart from the breaking of certain subsidiary cross linkages.

*Abstracted from Silk Journal & Rayon World.

The denatured or degenerate proteins are soluble in certain solvents such as concentrated aqueous solutions of urea or substituted ureas and it is possible to produce solutions of various viscosities.

The viscosity of a solution of a protein in aqueous urea undergoes a gradual increase with time and eventually gelling may take place which renders the solution useless for the production of filaments, etc. The viscosity of the solutions however, may be controlled by the addition of formaldehyde, benzaldehyde, glyoxal or the lower monoalkyl ethers of glycol, polyglycide, glycerol or gelatin, which enable a more highly concentrated protein solution to be used.

The aqueous solution of urea dissolves the protein, brings about degeneration and denaturation and exerts a high dispersive action on the degenerated or denaturated protein. Any vegetable globular protein capable of degeneration and denaturation may be employed and the strongest filaments are obtained when the denaturation has been as complete as possible. Good results have been obtained from ground-nut globulin, edestin, soya bean globulin and castor bean globulin.

The coagulating bath into which the filaments are "spun" counteracts the dispersive effect of the solvent; water, dilute salt solutions together with a trace of acid and a "spinning auxiliary" may be used.

The spinning auxiliaries are substances such as formaldehyde, benzaldehyde, glyoxal polymer, ethylene oxide, salicyclic acid, gelatin, triacetin, glycerol, glucose, and triethanolamine. The addition of 0.3 per cent of glyoxal polymer, for example stabilizes a solution of ground-nut globulin, in aqueous urea, for many hours, and leads to a production of a filament of greatly improved appearance and strength. The effect of the "spinning auxiliary" may also be towards the completion and stabilization of the process of denaturation, initiated by the solvents; the stabilizing effect may be due to subsidiary chemical linkages. The spinning auxiliaries may be incorporated in the solvent or in the spinning bath or in the form of an after-treatment. The after treatment may modify the properties of the filaments. For example, the mechanical strength may be increased by immersing them in aqueous solutions of formaldehyde, potassium dichromate, tannic acid, potash alum, or aluminium chloride.

TECHNICAL PROCESSES

An actual example is to grind into a fine powder a mixture of 35 part of air-dry, ground-nut seed globulin, containing about 12 per cent of moisture, with 25 parts of urea, 5 parts of thiourea and one part of sorbitol. A solution is then made of one part of gelatin and 0.5 parts of glyoxal polymer in 78 parts of water. The powdered mixture is added to the solution with stirring until complete dispersion is obtained, when the solution is filtered and centrifuged at high speed to remove air bubbles. The final solution is then allowed to stand for about 20 hours, during which time the viscosity gradually rises, and the solution becomes ready for spinning, being in its best condition between the 2nd and the 5th day after preparation; there is a tendency to gel on more prolonged standing.

The spinning of the filaments takes place by extruding the solution into a bath containing 15 parts of ammonium sulfate, 2 parts of zinc chloride, 4.5 parts of sulfuric acid, 10 parts of glycerol, and 75 parts of water, at 50° C. The filaments are drawn through this solution for a distance of about 15 in. at a rate of about 130-150 meters per minute. The spool or reel on which the filaments are collected rotates above the bath containing the solution of glycerol or sorbitol, and is so situated that the filaments are continuously bathed in this liquid at room temperature. The complete spool is removed and immersed for at least 2 hours in another bath of sorbitol or glycerol solution at room temperature and in this case the bath acts as a softener.

The filaments or fibers may be strengthened by immersing in 40 per cent formaldehyde solution at room temperature for about 18 hours, after which they are thoroughly washed and dried.

Another example which follows the main technical features, of the above, states that 2 parts of 40 per cent formaldehyde, 2 parts glycerol, 25 parts of air dry castor seed globulin, may be ground into a cream with 78 parts of water. 30 parts of urea are slowly added with stirring when dispersion of the protein is readily effected. The viscosity of the solution increases readily during the next 4 hours, becoming ripe for spinning provided that this is done during 3-4 days. The solution is coagulated into a bath consisting of 10 parts of sodium sulfite, 5 parts of glacial acetic acid, 2.5 parts of 40 per cent formaldehyde and 80 parts of water at 40° C.

The filaments, etc., produced by the above means have properties which resemble those of natural silk and wool. The extensibility is stated to be remarkable, and is almost completely reversible for extensions up to 100 per cent, i. e., the filaments are actually elastic. It is possible to extend the filaments up to 600 per cent but the reversibility of the extension is correspondingly less complete.

In B.P. 467,812, the same trio of inventors, Astbury, Bailey and Chibnall, have caused casein to undergo the same sequence of operations. An example discloses the solution of one part of gelatin, 2 parts of 40 per cent formaldehyde, one part of salicylic acid and 30 parts of urea in 78 parts of water; this solution is placed in a mortar and 40 parts of air-dry casein containing about 10 per cent of moisture is added with stirring. The casein disperses rapidly to form a viscous solution which becomes ripe for spinning after standing for 2 hours.

The coagulating bath is composed of 10 parts of ammonium sulfate, 2 parts of zinc chloride, 4.5 parts of glacial acetic acid and 75 parts of water at 35-40° C.

These processes do not yet appear to have reached commercial exploitation but, as there is no doubt as to the soundness of the underlying fundamental principles, the appearance of the new product is awaited with intense interest.

PROCEEDINGS OF THE
American Association of Textile Chemists and Colorists

DECEMBER 27, 1937

Officers of the Association

WILLIAM H. CADY, *President*
U. S. Finishing Co., Providence, R. I.

ALBAN EAVENSON—ELMER C. BERTOLET, *Vice-Presidents*

WILLIAM R. MOORHOUSE, *Treasurer*
National Aniline & Chemical Co., Boston, Mass.

HAROLD C. CHAPIN, *Secretary*
Lowell Textile Institute, Lowell, Mass.

LOUIS A. OLNEY
President Emeritus and Chairman of the Research Committee
Lowell Textile Institute, Lowell, Mass.

Councilors-at-Large

BERKELEY L. HATHORNE
G. R. KREMERS
CARL Z. DRAVES
HAROLD M. CHASE
ARTHUR E. HIRST
HENRY F. HERRMANN

Councilors Representing Sections

BEN VERITY (Rhode Island)
HANS MEYER (New York)
ROLAND E. DERBY (N. New England)
C. A. JONES (South Eastern)
R. M. RITTER (Philadelphia)
ELMER F. SMITH (Midwest)
R. S. WHEELER (South Central)
THOMAS R. SMITH (Piedmont)

Local Sections and Their Officers

Northern New England Section
Carl Z. Draves, Chairman, Ludlow Mfg. & Sales Co., Ludlow, Mass.
John N. Dalton, Secretary, Pacific Mills, Worsted Division, Lawrence, Mass.

Rhode Island Section
Richard Haworth, Chairman, 25 Fountain St., Providence, R. I.
Raymond A. Pingree, Secretary, 7 Sayles Ave., Saylesville, R. I.

New York Section
George L. Baxter, Chairman, Bradford Dyeing Association, 40 Worth St., New York, N. Y.
P. J. Kennedy, Secretary, E. I. duPont de Nemours & Co., Inc. 61 Thomas St., New York, N. Y.

Philadelphia Section
Herbert S. Travis, Chairman, Rohm & Haas Co., Inc., 222 West Washington Square, Philadelphia, Pa.
Paul L. Speakman, 1506 Delaware Ave., Wilmington, Del.

Piedmont Section
Raphael E. Rupp, Chairman, Pacific Mills, Lyman, S. C.
J. W. Ivey, Secretary, Mathieson Alkali Works, Inc., Charlotte, N. C.

South Central Section
Walter E. Hadley, Chairman, Standard Coosa Thatcher Co., Chattanooga, Tenn.
Murray B. Smith, Secretary, 2404 Union Ave., Chattanooga, Tenn.

Midwest Section
Edward J. Siegrist, Chairman, Holeproof Hosiery Co., Milwaukee, Wis.
Herbert W. Tetzlaff, Secretary, Geigy Co., Inc., Milwaukee, Wis.

South-Eastern Section
E. A. Feimster, Jr., Chairman, Eagle & Phenix Mills, Columbus, Ga.
Alfred R. Macormac, Secretary, Alabama Polytechnic Institute, Auburn, Ala.

Lowell Textile Institute Student Section
Lee Gale Johnson, Chairman; Hugh Francis Carroll, Secretary.

North Carolina State College Student Section
A. E. Snumate, Chairman; J. W. Furr, Secretary

Philadelphia Textile School Student Section
Wayne F. Fry, Chairman; Robert Roecker, Secretary

MEETING, NORTHERN NEW ENGLAND SECTION

A MEETING of the Northern New England Section was held at the Riverbank Court Hotel, Cambridge, Mass., on Friday, November 5, 1937, with 64 members attending the dinner and 85 attending the meeting which followed.

Professor E. R. Schwarz of the Massachusetts Institute of Technology gave a very interesting talk entitled "The *What* of Textile Technology." Professor Schwarz clearly defined the *what*, *how* and *why* of textile tests with considerable emphasis on the precision of the measurements and data.

The Chevrolet Motor Company presented two sound moving picture films entitled, "Precisely So," and "Factory Safety." The former was very interesting as it showed the great precision demanded in the manufacture of automobile parts and the methods used by the Chevrolet Motor Company in maintaining such precision.

Respectfully submitted,
JOHN N. DALTON, *Secretary*.

The next
Quarterly
Research Number
will appear
January 10, 1938

Modern Views of pH Measurement*

G. A. PERLEY†

IN discussing the subject of hydrogen ion measurement with a group of textile chemists, it would be natural to expect that we might begin by a consideration of such subjects as scouring of cotton and wool, cotton bleaching, degumming of silk and wool, desizing, mercerizing, washing, acid and basic dyes, and even the water supply. All of these subjects are of vital interest. Each mill has established its own pet scheme of hydrogen ion regulation for each of the above processes and hence every subject opens up interesting debatable features.

The subject of the measurement and control of hydrogen ion concentration is of a very general and universal nature. Once we know the fundamentals, it makes little difference whether we are textile chemists, paper chemists, sugar chemists, or manufacturing or industrial engineers, we can apply these fundamentals with success to any given problem. Prompted by this viewpoint, it would seem wise, even before a group which is interested essentially in textiles, to consider the general rather than a specific case of hydrogen ion measurement.

What is the purpose of a hydrogen ion measurement? It may be the correct thing to do just because one learns that a competitor is operating a certain process at 6.1 pH, yet with all of the interest in this subject, there must be a more deep-seated reason for hydrogen ion measurements.

Volumes of published papers bear witness to the fact that the hydrogen ion concentration affects all kinds of chemical interactions. Probably even those who received their college training forty years ago will remember the interest in the role of the hydrogen ion concentration in the catalysis of sugar inversion. However, today we have accumulated a mass of facts which show that a certain hydrogen ion concentration favors the best condition for the following:

1—Rate of settling.
2—Speed of filtration.
3—Grain size of a precipitate.
4—Completeness of precipitation.
5—Stability of a compound.
6—Freedom from corrosion.
7—Speed of chemical interaction.

To the manufacturer, these facts mean something else. A proper realization of the importance of maintaining the correct hydrogen ion conditions represents a big dollars and cents sign since it means:

1—Improved quality.
2—Greater uniformity.
3—Decreased spoilage and prevention of waste.
4—Increased production.
5—Decreased labor costs.

The problem of chemical industry is to make a profit on the investment and the above factors have much to do with this situation.

With a clear viewpoint as to the value of hydrogen ion control, it is equally important to obtain an appreciation of the accuracy which is essential for good control. In many ways it is unfortunate that we have developed a pH scale which accepts 7.0 pH at 22° C. as the neutral point, 0.0 pH for a 1.0 normal completely dissociated acid and 14.0 pH for a 1.0 normal completely dissociated base. It is far too easy to talk about 0.01 pH without even appreciating the fact that we are discussing hydrogen ion. In our contact with industry, we have noted that the average chemist is prompted to make many hydrogen ion measurements with a precision far beyond the demands of a given process. A certain amount of this attitude is due to the looseness with which the pH scale is used. We desire to refrain from any lengthy theoretical considerations yet we should remember that the pH refers to log $\frac{1}{+\text{H conc.}}$. Thus an increase of 1 pH corresponds to a decrease of 1/10th of the original hydrogen ion concentration. As an illustration as to how easy we may be misled, it should be pointed out that 6×10^{-4} is twice 3×10^{-4}, yet a hydrogen ion concentration of 6×10^{-4} corresponds to 3.22 pH, while 3×10^{-4} corresponds to 3.52 pH. Hence, a 0.30 pH change, at this hydrogen ion concentration, corresponds to doubling of the active ion involved in this consideration. This may mean a great deal in one certain situation and very little in another.

We should recognize that a hydrogen ion measurement in a research laboratory is involved with a precision of one order, while the measurement in a control laboratory or mill, probably is involved with a far different precision. The first essential in the control of any process is to study that process by means of indicating measurements in the laboratory.

* Presented at meeting, New York Section, Nov. 19, 1937.
† Leeds & Northrup Co.

There is a definite demand in the laboratory for indicating instruments of known reliability and with a precision far lower than is demanded in the mill. It is a false idea to believe that one instrument may be used efficiently for the problems of the central laboratory as well as for the plant control. As a matter of fact, the principles behind the measurement of hydrogen ion concentration are not greatly different from those in the measurement of temperature. No progressive chemist would attempt to make a wide variety of temperature measurements with a single type of thermometer or attempt to use standardizing laboratory equipment out in the mill or plant. If a hydrogen ion measurement is of any importance at all, it is certainly essential to have the central laboratory equipped with reliable apparatus. The choice of the proper mill or plant equipment should be made only after a careful laboratory study of the requirements of the process. The laboratory study may indicate that the process requires a control to within ±0.1 pH., or it may show that a variation of ±1.0 pH may be tolerated. The choice of the mill equipment for the measurements then becomes relatively simple, yet it postulates that the laboratory knows the essentials of hydrogen ion measurement.

The above consideration brings us to an important question. What sort of equipment is essential in the central laboratory for the standardization of the complete hydrogen ion apparatus?

There has been a tendency during the past two years towards the doctrine that the glass electrode is the universal answer to all pH measurements. Even quite recently one of the better known manufacturers of colorimetric pH equipments has added a glass electrode equipment to his line. In the enthusiasm to advance one particular method above another, we find misinformation is continually being broadcast. In one manufacturer's booklet of recent circulation we find the following: "With a sensitive potentiometer and galvanometer, proper liquid junction, accurate calomel cell, standard cell and working cells, etc., the accuracy of the quinhydrone electrode may exceed 0.05 on buffered solutions. With the ordinary commercial quinhydrone electrode, the overall accuracy will rarely exceed 0.1 pH." As a matter of fact the quinhydrone electrode is still one of our most practical and useful pH measuring systems. A complete measuring unit may be obtained for less than $65.00 and this unit should be reliable for many years. There are hundreds of applications for the measurement of pH over the range of 0 to 9.0 where it is the easiest procedure to use a quinhydrone electrode system and obtain a limit of error of 0.02 pH. Moreover, measurements may even be made in dilute solutions of nitric acid, ferric chloride, etc. It is too generally assumed that the presence of either an oxidizing agent or a reducing agent is sure proof of an important oxidation/reduction potential and such is not the case. Then, too, the quinhydrone electrode is of the type where the inaccuracy is self-evident. If limiting conditions prevail, a constant potential will not be obtained. However, with a glass electrode the sources of error may result in a constant reading and the resultant error is not obvious unless checked with a supplemental electrode. It is thus a very natural thing to wonder whether we can discard all of the time-tested pH measuring equipment. The answer can be given only after a careful consideration of the various primary systems since the choice of the measuring equipment depends upon the type of primary system which must be employed.

As is well known, we have two essential types of pH measurements—

a—The electrometric
b—The colorimetric

Both have their use in industry, yet both may have definite limitations under certain conditions.

The hydrogen gas electrode method of measurement is still the basic reference. By means of measurements with this system, the colorimetric method has been observed to have the following sources of error:

a—salt errors
b—protein errors
c—acid errors
d—temperature coefficients
e—off color errors
f—oxidation/reduction errors
g—colloidal errors

The magnitude of these errors depends upon the specific conditions. For instance, if a 6.4 pH phosphate buffer is contaminated with 0.5 molar magnesium chloride, there will be an error with the colorimetric method of +0.55 pH by chloro phenol red due to the salt error. The addition of 0.5 molar potassium chloride to a 1.9 pH hydrochloric acid causes the colorimetric measurement to read too high by 0.10 pH using m-cresol purple.

A one per cent gelatine in a 7.78 pH buffer gives a reading 0.72 pH too high as measured by Thymol Blue.

Probably the most frequent error is due to the failure to recognize that pH color standards made from buffer mixtures must always be used at the same temperature at which they were originally standardized. An increase in temperature generally causes an increase in ionization. The variation of the neutral point of water with temperature is a good illustration of the temperature factor. For water, the pH value at the neutral point is 7.0 if the temperature is 22.0° C. At 0° C. the pH value of the neutral point is 7.47 and at 100° C. the pH value of the neutral point is 6.12. Certain buffers have temperature coefficients which are different from other buffers. If we measure at 20° C. a 5.02 pH buffer consisting of citric acid and sodium hydroxide, we will find that this buffer is 5.12 pH at 60° C., yet a boric acid-sodium hydroxide buffer of 9.94 pH at 20° is 9.40 at 60° C. If we are using a solution in the mill at 60° C., and have no information as to its specific temperature coefficient, and cool this down to 25° C. in order to make the laboratory measurement, it is clear that the measurement may be misleading.

Although the hydrogen gas electrode has been used as the basis of preparing reference buffer standards for years, as well as for the determination of salt errors of various electrode systems, there seems to have arisen a great dislike to this method. This is a distinctly unfortunate situation as the hydrogen gas electrode is still a very important electrode system. No central laboratory should be without the facilities for making this type of measurement.

Many measurements of pH are made without any serious attempt to check the accuracy of the system. If the results of daily measurements involve the same errors, then the argument of reproducibility might be sound. However, the colorimetric salt errors of an industrial solution as determined from day to day may not be reproducible or the sodium errors of the glass electrode may show wide daily variations.

In the electrometric method we are involved with a measurement of the difference of e.m.f. between two half cells, the one a reference and the other the hydrogen ion responsive element. Thus we have:

$$E_{observed} = E_{ref.} - E_{meas.}$$

Unfortunately this is not the complete story, as we may have a third variable potential at the junction between the reference half cell and the solution. It is assumed that the use of a saturated potassium chloride bridge reduces this error to a small value. Faulty design of this junction may be responsible for a considerable error.

The choice of a reference half cell must involve the following considerations:

a—reproducibility
b—permanence
c—ease of preparation
d—temperature coefficient

The more popular reference half cells are the saturated calomel, the tenth normal calomel and the silver/silver chloride. The ease of preparation and the reproducibility of the saturated calomel half cell are outstanding characteristics. The silver/silver chloride electrode requires considerable painstaking efforts in its preparation and the resultant potential depends upon the care taken in fixing the chloride ion concentration in which this electrode is submerged. The moderate variations of potential with slight chloride ion concentration changes, of the tenth normal potassium chloride, make the tenth normal calomel half cell a source of constant worry. While all of the above reference electrodes may be made with considerable accuracy, it seems to the writer that the saturated calomel half cell is the most practical industrial reference for all around use.

We have the following measuring electrode systems:

a—the hydrogen gas electrode
b—the quinhydrone electrode
c—the glass electrode
d—metal/metal ion electrodes such as the antimony electrode

Contrary to some of the present day advertising, there is at present no universal electrode system. Every one of the above half cells under certain conditions may give false measurements. Much has been written relative to the limitation of the hydrogen gas, quinhydrone and antimony electrodes, and one might be led to believe that the glass electrode is the one and only measuring system. This is not the true picture.

It is interesting to survey the requirements of a textile laboratory.

The scouring of cotton may be carried out over the range of 11 to 13 pH, dependent upon the specific mill. Cotton bleaching is done at 5 to 6 pH or from 8 to 10 pH. The production of oxycellulose takes place the most rapidly at 7.0 pH and this represents damage to the fabric. Wool bleaching in various mills is in the range from 6.5 to 11.5 pH. Degumming of silk and wool is carried out at 8.5 to 9.5 pH. One authority claims that the degumming of silk is most effective at 8.6 to 8.8 pH.

The stability of oil-water emulsions used in silk soaking depends on the pH. The same holds true in relation to the strength and luster of mercerized cotton. The effective use of various enzymes in the removal of starch size from cotton depends on the pH. The most favorable range for malt diastase desizing is from 4.0 to 5.0 pH, while the most favorable mold or fungus diastase is close to 5.4 pH. Pancreatic enzymes are most active at 7.0 pH. The lower limit for average basic dyes is 11.0 pH, while the upper limit for acid dyes is 2.0 pH. The practice of the various mills varies considerably due to the specific nature of their problems, yet probably it is recognized that wool and silk are amphoteric substances. For wool fibers the minimum reaction will be found in solutions at 4.8 pH, while for silk fibers the least reaction is at 3.8 pH. These are the respective isoelectric points. In processing these two types of fibers, it is important to remember that damage to the fibers will increase as the hydrogen ion increases or decreases beyond the isoelectric point. The solutions must be adjusted to the pH value where the maximum efficiency may be obtained with the least material damage. Cotton and rayon fibers are less subject to attack.

The above very brief survey of a few of the features of the textile situation indicates that the textile chemist must be involved with pH measurements over the range of 2.0 to 13.0 pH, in water or in oil-water solutions, in the presence of bleaching agents, or in the presence of enzymes. It is asking a great deal to expect that one hydrogen ion equipment can serve efficiently for these wide variety of conditions and practically such is the case. It is possible to obtain a series of pH readings on one type of equipment, yet subsequent inconsistencies and troubles must ultimately result unless the correct equipment is utilized for each requirement.

What are the essential features which must be considered before selecting the correct pH measuring equipment for a specific test? The following facts must be established:

a—Are we dealing with an aqueous or a non-aqueous solution?

b—What is the solute composition and concentration?

c—Is the solution colored or colorless?

d—Is the solution turbid, colloidal or clear?

e—Are we dealing with a buffered or a non-buffered solution?

f—Are oxidizing or reducing systems present?

g—Is the pH related to the concentration of dissolved gases?

h—What is the temperature variation?

i—What probable range of pH is to be encountered?

j—What is the variation and rapidity of pH change?

k—What limit of error is required in the measurement before adverse results are encountered in the process?

An intelligent and accurate measurement of pH is not a matter of pressing a button, turning a dial and observing a scale value. A mill measurement may appear to be essentially the above, yet whether the operations of that mill are efficient or not depends upon how well the chemist has established the above variables, and selected the proper pH meter for the mill through a careful analysis of the problem in the central laboratory.

Many of the limitations of the various electrode systems are easily accessible in the literature. The more important features may be summarized in the following:

1—The Hydrogen Gas Electrode

Advantages

No salt error.

The established method for standardization of buffers.

A measurement with a limit of error of 0.01 pH is possibly available over the total range of 0.0 to 14.0 pH.

Adaptable to turbid or colored solutions.

Is a low resistance system.

Limitations

Requires a special catalytic surface which may be poisoned.

Inaccurate when dissolved gases are involved in the pH equilibrium.

Oxidation/reduction systems cause errors.

Inaccurate in the presence of metals below hydrogen in the "electromotive series".

Sulfides, sulfites, calomel, arsenic compounds, etc. are possible sources of error.

Not easily adaptable to continuous measurements.

Not adaptable to unbuffered solutions over the range of 5.0 pH to 8.5 pH.

2—The Quinhydrone Electrode

Advantages

Does not require a special electrode surface.

Not influenced by dissolved gases such as CO_2, air, etc.

A limit of error as small as 0.02 pH is possible below 8.8 pH.

May be used in solutions of mild oxidizing or reducing intensity.

Adaptable to solutions containing nickel, copper, aluminum, milk, beer, blood, soil solutions, etc.

Adaptable to turbid or colored solutions.

Is a low resistance system.

Limitations

Addition of quinhydrone contaminates the solution.

Limited to the range of 0.0 pH to 9.0 pH.

Decomposition and oxidation at 9.0 pH and above causes erroneous readings.

Has certain salt errors if salt concentration above 1 molar.

High concentrations of ferric salts, hydrogen sulfide, chromates, peroxides, permanganates, hypochlorites and sulfites give errors ranging between 0.3 and 2.0 pH.

Sparingly buffered solutions may involve errors in solutions above 5.0 pH.

3—The Antimony Electrode

Advantages

Very rugged construction.

Does not require catalytic surface or addition of auxiliary material.

May be standardized for specific solutions with a limit of error of ± 0.1 pH.

May be used in turbid or colored solutions.

Adaptable to measurements in heavy sludges, viscous fluids and semi solids.

May be used for continuous recording.

May be used in the presence of lime, alum, phosphates, sulfites, carbonates, borates, acetates, ammonia, sugar, soap, soil suspensions, clays, wool scouring solutions, etc.

Is a low resistance system.

Limitations

Salt errors of considerable magnitude.

An overall limit of error of ± 0.2 pH for average conditions.

Calibration for still solution different from that of moving solutions.

Very susceptible to contamination by copper even in concentrations of 0.5 P.P.M.

Susceptible to errors in presence of oxidation/reduction systems.

Calibration dependent upon whether solution is saturated with air or other gas.

4—The Glass Electrode

Advantages

Does not require gas, catalytic surface or addition of auxiliary material.

Adaptable to oxidizing and reducing solutions.

May be used in colored solutions.

After standardization a limit of error of ±.03 may be obtained.

May be used for continuous recording.

Adaptable to semi solids and thick fluids.

In absence of sodium salts may be used in presence of Ba, Ca and ammonium hydroxide of high concentrations.

Limitations

Inaccurate in the presence of sodium salts at ranges above 9.5 pH. The higher the pH and the greater the temperature above 20° C., the greater is the error. The errors at 25° C. follows:

pH	0.1 N Na	1.0 N Na	2.0 N Na
9.7	.01 pH	.02 pH	.03 pH
10.5	.10 pH	.25 pH	.32 pH
11.5	.33 pH	.62 pH	.86 pH
12.5	.55 pH	1.02 pH	1.40 pH

An error is introduced in pure water measurements due to the solubility of the 015 Corning glass in distilled water.

The glass surface is highly adsorptive. When changing from a buffer solution to an unbuffered solution, considerable washing is required. The thicker and more robust the glass electrode, the greater must be the degree of washing.

High resistance systems. Susceptible to errors due to current pick-up and leakage.

A review of the above summary indicates that no pH measurement should be attempted without establishing certain facts. It is obvious that any laboratory which depends upon one single electrode system may be inviting trouble.

We are confronted in current advertising with descriptions of various direct reading pH meters. There may be justification for such equipments for use in connection with mill and plant measurements, yet once we establish an equipment with a pH scale for one certain electrode system, we are limiting the equipment to the use of one particular type of electrode. This is a very dangerous procedure unless the whole situation has been carefully studied in the central laboratory, where complete pH measurements have been checked by the proper type of electrode systems:

An appeal is made in this presentation for a more careful study of the problems of pH measurement. The facts must be established in the central laboratory by the use of precision equipment involving the use of probably the hydrogen gas, the quinhydrone, the glass and the antimony electrode systems. The choice of equipment for use in the mill will depend upon the nature of the solutions being handled. There are many industrial applications where a limit of error of ±0.5 pH in the measurement is very adequate and for these cases there is no justification for the more expensive equipment. There are also many problems in the industrial laboratory requiring an instrument of sound workmanship, the best quality and of the highest precision. Both types should be found in the inventories of all plants and mills.

DISCUSSION

Mr. Schmidt: You spoke about colorimetric devices. You didn't say anything about, say, a machine like the Wolfe pH with the strips. How does that compare?

Mr. Perley: That is an embarrassing question to me, because I might possibly be biased in view of the fact that I am most interested in electrometric devices.

I have a Wolfe in my own laboratory, and I find that over a period of time I have gotten about the same limit of error, the same difficulties, and the same limitations with it as I did with the other colorimetric methods of measurement. All of the colorimetric methods, as I said, are useful and if you know that you do not have salt errors, if you know you do not have acid errors, or oxidation-reduction errors, you can get a fairly satisfactory measurement.

To illustrate, supposing you have one per cent gelatin in a 7.78 buffer. The colorimetric method will be in error by about 0.70 pH with a certain indicator. You have to know some of those things and know the nature of your solution, but if you know it, you are all right.

Dr. Harold: I would like to ask Mr. Perley what has happened to the colorimetric test which is supposed to work even in turbid solutions. Strips were used and they were covered with some sort of lacquer, which prevented the paper strip from being stained by the colored solution, or by any solids that were in there. It was supposed to work through the lacquer by some sort of method of filtration and give you reliable coloration. I notice that they no longer seem to be on the market. Were they successful?

Mr. Perley: I am sorry, Dr. Harold. I am not sufficiently familiar with that situation to give an answer. I do not know.

Mr. Desher: What is the best method for determining alkalinity of hydrogen peroxide?

Mr. Perley: I can give you a definite answer. We make very accurate estimates of the alkalinity of hydrogen peroxide with the glass electrode, providing we do not get into too high sodium ion content. We have been fortunate that we have been able to keep below 9.5 pH, or 10.0 pH, with hydrogen peroxide solutions and under these conditions there is very little sodium error. Thus you can obtain accurate measurements with the glass electrode under those conditions.

Mr. Desher: How about ammonia?

Mr. Perley: Ammonia should not worry you at all. As a matter of fact, if you have ammonia in solution, you can go up to 13.0 pH. You can use the strongest ammonium hydroxide solution you can possibly prepare and get a high degree of precision with the glass electrode. The glass electrode has no error in the presence of calcium salts, in the presence of barium salts, or ammonium hydroxide even at high alkalinities.

Lanital and Synthetic Wools*

American Dyestuff Reporter Dec 27, 1937

C. SCHOLER†

IF you don't mind, I would rather lead up to Lanital, for a good reason, which I will explain to you later on. I am not a public speaker, nor am I a chemist, and if this talk should be a flop, you will have to blame my good friend, Dr. Harold. He should have known better than to make me give a speech.

The title of my talk is "Lanital and Synthetic Wools." I shall also show you some slides of the most important textile fibers, such as vegetable fibers, cotton, ramie, flax and hemp; animal fibers, silk, wool and hair fibers; mineral fibers, glass and asbestos; synthetic fibers, viscose, acetate, cuprammonium, Bemberg, Lanital and regenerated silk.

As you no doubt all know, spun rayon staples have the same basic fibers as filament rayon yarns, but instead of the filaments being of a continuous length, they are cut into suitable lengths, depending on the spinning system for which they are intended. These cut staples are comparable to cotton, silk, or wool, as far as diameter and length are concerned. In fact, they are handled on the same machinery which was originally used for cotton or silk spinning, or wool spinning, of course.

As far as luster is concerned, we have bright and dull staples just the same as in filament rayons or filament acetate yarns.

The size or denier of cut staples is practically standard. So we have the following: one and a half deniers, which is comparable to raw silk filament; three deniers, which is comparable to fine Australian wool; five and a half deniers, which is comparable to medium domestic wool; eight and ten deniers, which are used mostly for carpets.

Then we also have ten, fifteen, twenty, and even coarser deniers which are used in coarse yarns, or in blending with finer sizes to produce cross-dyed effects. For very pronounced cross-dye effects, there is also a flat cut staple, running much coarser. This can be had in bright as well as in dull staples.

The length of staple depends on the spinning system for which it is used and the effect we expect to produce with these yarns. The cotton system uses a staple one to two inches long, generally an inch and a half long. Woolen staples run from two to seven inches. Silk staples run up to six inches.

Besides cut staples, we also have rayon waste, or acetate waste, which is waste from various manufacturing processes. As a rule, this waste is a mixture of fine and coarse fibers, and of mixed lengths, and is mostly used for coarse woolen effects.

Now as to yarns: Filament rayon yarns are made from fine continuous filaments, which lie parallel to each other and have a smooth, compact appearance; whereas in cut staple yarns the fibers protrude from the yarn, and the coarser the denier, the more pronounced this condition will be. The yarn is more bulky and softer, more like cotton or wool.

As to size of yarns, the finer and longer the staple, the finer the yarn can be spun. However, there is a limit in size to which cut staples can be spun, for two main reasons: First, rayon staples are smooth, unlike the cotton staple, which has a natural twist, as can be readily seen through the microscope, or the wool staple, which has a rough, scaly surface. Both of these qualities help to prevent the fibers from pulling apart. Whereas, rayon fibers have very little elasticity, and as a result, the breaking strength is lower than in other fibers.

Twist

The shorter the staple, the more twist is necessary to hold the fibers together. The longer the staple, the fuller and softer the yarn will be, owing to the fact that less twist is necessary for long staples.

Blending

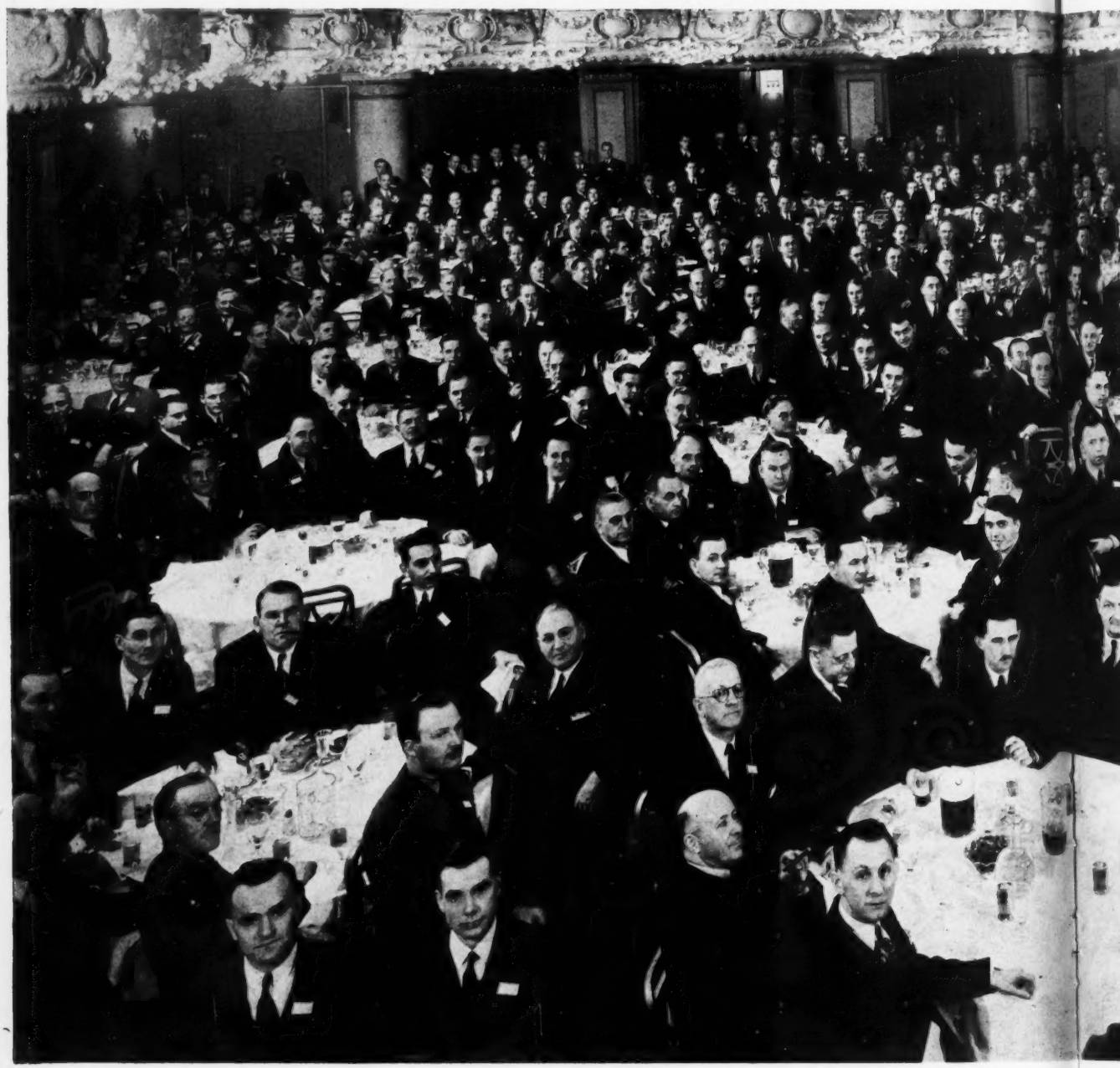
By this, we mean the mixing of two or more fibers, either of a different nature, different diameter, or different length, such as rayon and cotton, rayon and wool, or rayon and acetate. The purposes of blending are manifold: for instance, by blending rayon with cotton, to increase strength, or blending rayon with wool, to reduce cost. Another purpose is to obtain cross-dye effects. If fine sizes of fibers are used, as much as fifty per cent may be used in a mixture; whereas, a mixture of five per cent may be enough for coarse yarns or coarse fibers. Some yarns depend entirely on the blending of the fibers and the effect desired, and also the twist that is used. To obtain soft effects, and to increase the strength of the yarn, a mixture of rayon and silk is often used, especially in fine sizes. For instance, for underwear, where you use very fine yarns, if you used a rayon you would have so few filaments that the thread would not be strong enough. The fact is established that many fine filaments are much stronger than few coarse ones for the same size of yarn.

Another good fiber to mix with rayon is tussah. Tussah

(Continued on page P840)

*Presented at meeting, New York Section, Nov. 19, 1937.
†National Silk Spinning Co., Inc.

Scene at the opening of the Seventeenth



Official Opening
Seventeenth Annual Meeting

THE Opening Session of the Seventeenth Annual Meeting of the American Association of Textile Chemists and Colorists convened at the Bellevue-Stratford Hotel, Philadelphia, Pa., at eight-five o'clock, Mr. Herbert S. Travis presiding.

WELCOME BY CHAIRMAN TRAVIS

Chairman Travis: As Chairman of the Philadelphia Section, it is indeed a pleasure to bid you welcome to the Seventeenth Annual Meeting of the American Association of Textile Chemists and Colorists. It is gratifying to see so many in attendance, and we hope the technical program

tenth Annual Meeting in Philadelphia

and entertainment which we have arranged will meet with your approval.

I am now going to call on our President and mutual friend, Mr. William H. Cady.

Mr. Cady! (Applause)

WELCOME BY PRESIDENT CADY

President Cady: Fellow Members and Guests: The Convention is on! I feel like saying "Hail, hail, the gang's all here". (Applause). I hope you are all as glad as I am to be back again after another twelve months.

. . . There followed an announcement as to the technical program on the morrow and then the technical program for Friday evening was presented. Complete details will appear in future issues. . . .

Lanital

(Continued from page P837)

is cheaper than wool. It is strong, and felts quite well. Then we have blending of yarns with rayon and nibs or slubs, in either natural or fast dyed wool or acetate. Either is effective, and numerous novelty effects may be obtained that way.

Then we again have combination yarns, where we use one thread of spun yarn with a thread of filament yarn. The spun yarn, being fuller, makes it soft, and the filament yarn gives it a firmer touch.

We now come back to the famous Lanital. You no doubt read in the papers a few days ago that the Snia Viscosa Company which produces Lanital stopped production because the results were not satisfactory. This has been contradicted in the papers since then. There is no doubt about it, that Lanital production will not be stopped. In fact, I have had the good fortune to get samples, that is, the newest samples of Lanital, which were brought into this country just the other day by the Princess Caetani who represents the Snia Viscosa Company. She has not even shown these samples to the trade yet. I am the first one who has seen them, and I shall pass them around after a while.

Lanital is a fiber obtained from casein. As you all know, its characteristics are similar to those of wool. Even its chemical composition is similar to that of wool. According to Professor Menozzi it is as follows:

	Lanital	*Wool*
Carbon	53%	49.25%
Hydrogen	7%	7.57%
Oxygen	23%	23.66%
Nitrogen	15%	15.86%
Sulfur	0.7%	3.60%

We all know that experiments with casein have been made for years, but no real developments, as far as the yarn is concerned, have been produced. The first result, a thread which could be used for weaving and knitting, was produced about two years ago by a man named Antonio Ferretti in Italy. He sold the patent to the Snia Viscosa Company who, up to that time, had produced only filament rayons.

The raw material used for Lanital is skimmed milk. Don't ask me for any chemical formulas because I don't know anything about that, but the process is as follows: First, in the casein for Lanital the skimmed milk is separated from the fat, so that not more than one-tenth of one per cent of fat is left. Out of one hundred quarts of milk about six pounds of casein is produced, and one pound of casein actually produces one pound of Lanital.

The casein is stored in silos, according to its origin, the same as we do with rayons. When we buy them from the spinner, we keep them separate so we won't get mixed shades or any other defect in handling them later on.

Then the casein is dissolved with water and chemicals to make a viscoid solution for spinning. The whole thing is practically the same as with filament rayon.

The viscoid is led to spinnerets which are immerged into a coagulation bath of hot sulfuric acid.

To eliminate the acid from the sulfuric bath, the product is passed into a bath of salts.

After being washed in this salt bath, the fiber is cut into staple. Those of you gentlemen who have seen the spinning of rayon will recognize that the process is practically the same, except the chemical process.

The staples are then fixed in a bath of formaldehyde for ten to fifteen hours, and then they are dried in steam driers.

Lanital is not soluble before it is submitted to the fixing bath, the same as a photographic plate. If you do any photography, you will know that if you want to get your deposit of silver clear, you put it in hypo and dissolve the rest, your silver remaining on the plate. The same thing is true with Lanital.

We now come to the characteristics of Lanital.

Burning

It smells just like burnt milk. You can't mistake it.

The microscope shows that the fiber is absolutely smooth. Unlike wool, it has no scales.

Chemical Reaction

Lanital does not dissolve in caustic soda. I have tried it in comparison with wool and regenerated silk, and found that the wool dissolved in about two to three minutes, and regenerated silk dissolved in the same time; whereas, Lanital did not dissolve in a quarter of an hour. At the end of that time, it was just the same as when I put it in.

As far as appearance is concerned, it looks like a first-class merino wool, a fine Australian wool. The fibers look curly and open. If stretched, twisted or compressed they come back again to their original state when dry.

As far as size is concerned, the size, so far, has been as fine as three deniers.

Softness

Lanital fibers are not quite as soft as viscose staple. The touch is about the same as a wool type acetate fiber which is between a viscose and a wool staple. Lanital is especially suited for knitted fabrics, because the fibers are all of the same thickness, and you do not have any coarse fibers in it like you find in wool, it does not irritate the skin.

Dyeing

This is done in the usual way, with wool dyes. Lanital will stand a temperature well above the boiling point. It will stand steam for two to three hours without dissolving the fibers. Up to a few months ago that was one of its weakest points: When you wet Lanital it just simply went; it lost its strength. Mixtures of Lanital and wool dye well together, that is, in the same dye bath.

Warmth

Lanital is equal to the warmth of wool.

There is no shrinkage in Lanital, such as you find in wool, and it is absolutely immune to moths.

Elasticity

Lanital stretches considerably. That is one of its weakest points. It stretches as much as eighty-four per cent. There is only one other fiber which is practically as bad, and that is regenerated silk—as far as weakness is concerned, I mean.

Effect of Water

Lanital absorbs water rapidly, and the fibers stick together. However, when they are dry they open up again. Water will also reduce the volume of Lanital. The thread, or the fiber, gets thinner, but it comes back again when it is dry.

Blends

While yarns have been made with one hundred per cent Lanital fiber, in coarse yarns, especially for the knitting trade, most of the mixtures have been made with fifty per cent Lanital and fifty per cent wool, or seventy-five per cent Lanital and twenty-five per cent wool. I can readily see why they do that. If they put wool in it helps to increase the strength, and if it should get wet it doesn't part so easily.

As I told you before, I have been very fortunate to get these samples from the Princess Cora Caetani who is in the country now. She represents the concern which makes Lanital. Of course, it was quite a shock to her to see the papers which stated that her concern had given up the production of Lanital. She cabled them and the answer was, "Emphatically no. It is not stopped." And I know, for a fact, that instead of stopping, they are building a new mill to produce Lanital.

By the end of next year they expect to make about twenty million pounds of Lanital a year. When we consider that Lanital was introduced in September, 1935, this is quite a production. Of course, it is nothing yet as compared with wool or rayon output. Rayon staple production was 275 million pounds last year, and it may be doubled this year. In fact, I am informed that Germany is going to produce more rayon staple next year than filament yarn.

The production of Lanital in 1935 was nil. They only made experiments. In 1936 they produced 209,000 pounds. In 1937, 1,695,000 pounds were produced up to July. That is the reason why you didn't see any Lanital in this country. What is a million pounds? Nothing. I know that about one thousand pounds were imported into this country by some wool manufacturers, for experimental purposes only. The Government, in Washington, also worked with it. The production, as I say, so far is insignificant.

The balance of the production, which they kept over there, was used only in Italy. None of it was exported, partly to protect the countries who have bought the patent rights. They have been very smart. They sold the patent rights to practically every country, and no doubt, whatever troubles there are in connection with it will be cured in a short time. They are all working on it now. So far, the rights have been sold to Canada, France, Belgium, Holland, Poland, Czechoslovakia and Germany.

As to price, the price of Lanital at the present time, in Italy, is about $1.75 per pound, which is a high price. It would be in this country. We can buy real wool cheaper today than we could buy Lanital. But for Italy, which has to import its wool, this price may still be lower than the price of real wool.

The total production of casein in Italy is about twenty million pounds at the most; that is, if they use all the casein from the milk which they produce, and it would take a hundred thousand cows to produce that much casein. I doubt whether they have that many cows there. (Laughter.) So they will have to buy their casein from abroad. They get it from Holland and Denmark, and it is probably cheaper than what they could produce it for, themselves. They could, of course, make a drive, as in the case of war; they could collect all the milk, and make the people stop eating cheese. But that will never happen unless they are forced to do it.

But even at that, if they used the twenty million pounds that they could make with all their milk, that would only be about twenty-five per cent of their present consumption of wool. They actually use about forty thousand kilos, or eighty-eight million pounds. So you can see that Italy is no great competitor to our wool growers in this country—not so far. However, we cannot overlook the fact that synthetic wool is on the road and it is going to be here, just as rayon came into existence.

I myself have been connected with rayon fiber from its beginning. Everybody talked about rayon, ridiculed it. They thought it would never amount to anything. I know of only one man who had faith in it and that was Mr. Duplan of the Duplan Silk Corporation, with whom I was connected for twelve years. He used to tell us, twenty-five years ago, "Boys, the synthetic fiber is the coming thing," and he was right.

They say that the production of Lanital is temporarily suspended. At the same time, I have received information from abroad that tests are being made now, or experiments, with cellulose and casein, which probably will increase the strength and do away with a lot of the other shortcomings of Lanital.

I am sure that the final synthetic wool is not going to be made out of casein. It will probably be some vegetable albumin, or something. I don't know. I am no chemist. But I don't think it will be made from milk.

There is a fine chance for our American chemists to work on it, and I hope they will be the ones to discover it.

I am going to pass around a card which has three materials on it: real wool, Lanital, and a rayon fiber cut staple, which is made partly with cellulose and partly with casein. I wonder how many of you can tell which is which.

I shall also pass around some photographs of one of these fibers, which has been produced for about two years

with the twenty-five per cent casein. You will see the volume on these two photographs. One of them is the regular rayon and the other has twenty-five per cent casein in it. You will see the difference in volume. They are both of the same weight. It shows you how much more fluffy one is than the other.

I am going to pass around samples of the hundred per cent Lanital for men's wear. I received these samples today from the Princess who just landed in this country. She hasn't shown them yet, as I told you before, so please leave your scissors in your pockets. I think these samples are beautiful.

I want to talk to you some about that other fiber which is made of seventy-five per cent cellulose and twenty-five per cent casein. They do not call that casein. They call it a nitrogen product. This staple has found much favor with the trade, especially with cotton and wool spinners. That is the one you will see on the protograph, the large one. For the past two months a considerable amount of the staple has been shipped to this country. The production is still small. They do not produce more than nine million pounds a year, and only bright staple is exported for the simple reason that they are not allowed to do otherwise, because the patent is owned by the Tubize Chatillon Company.

This Cisalfa, as it is called, has certain characteristics not found in other rayons, as far as I know. The appearance is that of regular wool, due to its content of nitrogen. The volume, as you will see for yourself, is about the same as wool. It is nearer the weight of wool than the weight of regular rayon.

As for blends, I have seen some very interesting samples. I have seen goods made with one thread of this Cisalfa and one of regular rayon, and they make beautiful cross-dyes. In fact, if you choose the Cisalfa alone, the twenty-five per cent of nitrogen that is in there will produce a cross-dye in itself.

Its warmth is considerable. It is almost as good as wool.

The dyeing is about the same as for rayon.

Comparative tests, as far as elongation is concerned, show twenty-two per cent for wool and nineteen per cent for Cisalfa, which is almost the same. The breaking strength is fifteen kilos for wool and nineteen for Cisalfa. It seems to be stronger than wool. When I say breaking strength, that is based on two square millimeters.

That is that.

We will now get ready to show our slides.

. . . . At this point a number of slides were shown . . .

DISCUSSION

Mr. Walsh: What is Lanatin? Has that any relation to Lanital?

Mr. Scholer: No.

Mr. Walsh: I have some of the Lanatin here. It looks like jute.

Mr. Scholer: It is not Lanital. Have you a match? (Mr. Scholer burned the sample.) It is a vegetable fiber. There isn't enough light, I can't see it, but that is not Lanital. It is a vegetable fiber.

Mr. Bosti: I would like to know what class or type of colors Lanital is dyed with.

Mr. Scholer: Regular wool dyes.

Mr. Bosti: That would be dyeing in an acid bath. You spoke about it losing its tensile strength. What percentage do you feel that it would lose when wet and when in an acid bath, how much more effect on the tensile strength of this material?

Mr. Scholer: I can tell you that when we get some fiber over here. We haven't been able to get any.*

Mr. Bosti: I see here a color card with some dyed samples, so evidently someone must have dyed them.

Mr. Scholer: Those are dyed with Neocarmine, just to show the difference. Most of you will know what Neocarmine is. It is a German product. You can put any fiber into it, whether it is vegetable or animal, and each one dyes a different color. That chemical is sold by the Kali Chemical Works. I know Eimer & Amend also sell it.

Mr. Bosti: In other words, you haven't made any real tests on determining just what your tensile strength would be, and which colors would be most advantageous for dyeing.

Mr. Scholer: I have the tensile strength from Germany, but I take all those claims with a grain of salt. I would like to test it myself, first. There are many claims made for Lanital, and there are claims made for other fibers, but unless you test them yourself, you just simply take a chance in making a flat statement.

Mr. Bosti: But you would say that the regular run of acid colors are the right colors with which to dye them?

Mr. Scholer: Yes.

Mr. Walsh: Is Cisalfa a mechanical mixture or a chemical mixture?

Mr. Scholer: Chemical.

Mr. Walsh: Seventy-five per cent mixture?

Mr. Scholer: Twenty-five per cent nitrogen product and twenty-five per cent cellulose. Am I right on that, Doctor?

Dr. Smith: I believe that is correct, although I haven't seen it.

Chairman Baxter: You mentioned, in connection with Cisalfa, that you have seen cross-dye effects. Is that a complete cross-dye, that is, contrasting colors such as blue and red?

Mr. Scholer: I have seen it in light shades only.

Chairman Baxter: Light and dark shades varying in depth?

Mr. Scholer: No. For instance, a green and a blue combination, and things like that. I have seen three different shades today. There are actually two colors in pastel shades. I haven't seen any dark ones.

*Lanital staple is actually being imported now beginning with December, 1937, according to Meyer Marks, who are the distributors of Snia Viscosa and Lanital.

Chairman Baxter: That is a combination of Cisalfa and spun rayon fabric?

Mr. Scholer: Yes, I have seen them today, three very pretty shades.

Mr. Ephraim Freedman: Who developed the information on the relative warmth of the Lanital as compared with wool?

Mr. Scholer: I don't think I know that.

Mr. Freedman: I believe you made a statement that it was as warm as wool.

Mr. Scholer: Yes, that is right. That information came from a German source. I don't know the name of the doctor. I can't tell you. I would have to go back to my notes. However, I obtained the information from Germany, not from the Lanital people.

Mr. Freedman: It would be interesting to find out how the tests were conducted, if tests were conducted, and whether the tests were run on wool of like diameter as the Lanital—

Mr. Scholer: Yes.

Mr. Freedman: And whether they were run on fabric.

Mr. Scholer: About the same diameter.

Mr. Freedman: Do you know whether the tests were made on the fiber or on the fabric?

Mr. Scholer: On the fiber.

Mr. Freedman: I would be very much interested in learning the method.

Mr. Scholer: I believe they wound the fiber, several layers, one on top of the other. I think I have the scale.

Mr. Freedman: I would be very much interested in learning more about it.

Mr. Scholer: If I can find it I will let you have it.

Mr. Freedman: How about the elasticity of Lanital as compared with wool?

Mr. Scholer: It is really not elasticity; it is elongation. You know there is a difference between elasticity and elongation.

Mr. Freedman: What per cent does Lanital lose in strength when wet?

Mr. Scholer: Lanital loses pretty nearly all its strength when it gets wet. If you stretch it, it goes.

Mr. Freedman: How about resistance to abrasion?

Mr. Scholer: To abrasion?

Mr. Freedman: Yes.

Mr. Scholer: It seems to be very good. Just look at those samples I passed around here. They look very good. They have actually been used for men's wear. There is no doubt about that. They are being worn now.

Mr. Freedman: If they lose their strength when wet, how will they withstand washing? In other words, are they suitable for wash material?

Mr. Scholer: You don't wash men's wear. You dry clean them. If they are used for ladies' dresses, they are also dry cleaned. There are not many women who wash their dresses nowadays. My wife doesn't.

Mr. Freedman: You are referring, chiefly, I presume, to wool dresses and to some of the fabrics made, at times, of silk, or some of the rayons, although a good many silks and rayons are washable these days.

Mr. Scholer: They are washable, but how many people do wash them? Not many.

Mr. Freedman: Well, I haven't checked up, but I do know that the wash dress industry and the wash goods industry——

Mr. Scholer: I really can't tell you, but I don't believe they are being washed. I think I would be afraid to wash 100 per cent Lanital.

Mr. Freedman: How about the moisture absorption properties of Lanital?

Mr. Scholer: They are about the same as those of wool.

Mr. Freedman: Does any odor develop when Lanital becomes wet?

Mr. Scholer: Yes.

Mr. Freedman: It does?

Mr. Scholer: You know how milk smells.

Mr. Freedman: Well, Lanital, I understand, is casein plus formaldehyde.

Mr. Scholer: Yes.

Mr. Freedman: Is there any odor of formaldehyde from the Lanital when wet?

Mr. Scholer: No, it smells more like milk.

Mr. Freedman: Do you know whether any formaldehyde remains in the fiber after the fiber has been produced, after the fiber has been treated with formaldehyde, or is there an after-treatment to remove the formaldehyde?

Mr. Scholer: I can't tell you that.

Mr. Freedman: The reason I ask that is that we have at times used casein as food for moth larvae, and I was wondering whether the formaldehyde treatment prevented the larvae from attacking the Lanital.

Mr. Scholer: I don't think it does, and the fact that there is twenty-five per cent in the Cisalfa doesn't show anything. There is no odor to it afterwards. That has already been used considerably, and I have heard only good about it. Nobody ever brought that question up. In fact, we have used it in our own mill. We have spun the yarn and made cloth with it, and we have noticed absolutely nothing to that effect.

Mr. Freedman: Does the Cisalfa smell when wet?

Mr. Scholer: No, we have not noticed it. We have made men's wear and women's dress goods, and we haven't had any bad reaction whatsoever. We are actually making it now.

Mr. Freedman: Thank you. I would very much like to see some specimens if you have them.

Mr. Scholer: I will be glad to show them to you.

ONE HUNDRED AND FOURTEENTH COUNCIL MEETING

THE Council held its 114th meeting at the Engineers Club in Boston on Friday morning, October 15, 1937. Present were President William H. Cady, presiding; Wil-

Secretary's Balance Sheet—October 9, 1937

	Applications	*Dues, regular and reinstate.*	*Dues, Corp. and Sustain.*	*Miscellaneous*	*Bank charges*	*Totals*
Received by Secretary, Nov. 1, 1936 to June 10, 1937	$1,455.03	$7,860.45	$2,373.00	$1,607.10	—4.42	$13,291.16
Received by Secretary, June 10, 1937 to Oct. 9, 1937	349.00	41.25	.....	369.99*	— .28	759.96
Total received	1,804.03	7,901.70	2,373.00	1,977.09	—4.70	14,051.12
Transmitted to Treasurer	1,751.53	7,895.45	2,373.00	1,954.44		13,974.42
Leaving to order of Secretary	52.50	6.25	.....	22.65	—4.70	76.70

Miscellaneous

Year Books	$133.27	Crock-Meter Cloth	5.70
Dyestuff Reporters	13.40	Launderometer Royalties	104.00
Analytical Methods	16.51	Printing Paste Reports	.80
Dyed Standards	17.00		
Crock-Meters	79.31	Total	369.99

liam R. Moorhouse, Treasurer; Louis A. Olney, Chairman of the Research Committee; E. H. Killheffer and P. J. Wood, Past Presidents; Carl Z. Draves and Henry F. Herrmann, Councilors at Large; Hans Meyer, R. M. Ritter, and Ben Verity, representing New York, Philadelphia and Rhode Island, respectively; and Harold C. Chapin, Secretary. The Secretary's report of the 113th Council meeting, the Treasurer's report of October 14, and the Secretary's balance sheet attached hereto, were accepted.

It was voted that each new member be permitted to purchase one copy of the Year Book current at time of his election, or about to be issued, for the special price of $1.50 in order that he might have use of a book earlier than the issue to which his first year's dues would regularly entitle him. It was voted that the Association subscribe for three years Associate Membership in the National Farm Chemurgic Council. It was voted that a request be issued, through the Philadelphia Section, that all entertainment in private rooms during the Annual Convention be dispensed with, because experience had shown such entertainment to interfere with the success of such Convention. Price Waterhouse & Co. were appointed to audit accounts of Secretary and Treasurer.

Each of the following was elected to the class of membership specified, as of thirty days from publication of application, provided no objection be received meanwhile by the Secretary.

Active

E. J. Adams	J. E. Galarde	E. J. McNamara
R. C. Allison	L. E. Gingon	J. F. Noble
C. H. Asbury	E. B. Hall	R. C. Orozco
E. S. Atkinson	B. L. Hornby	C. J. Perkins
Jos. Bardacke	H. H. Hughes	J. H. Phillips
W. D. Barrett	L. W. Hutchins	A. Redfern
O. O. Brant	N. N. Johnston	D. S. Rion
R. E. Butterworth	L. Kapelsohn	A. Scholler
M. M. Calhoun Jr.	E. A. Kitchen	Saul Sigel
C. C. Cayce	N. Koenigsberg	A. L. Sladen
J. R. Clendenning	J. E. Lawton	R. M. Stribling
E. R. Coe	J. J. Marshall	W. B. Strickland
D. M. Syster	G. H. May	

Junior

E. K. Atkinson	R. A. Carroll	R. L. Jones
J. S. Beattie	L. A. Castonguay	B. F. Pimentel
H. W. Berry	H. X. deRedon	H. Rosman
R. J. Carey	Ben. Hodes	F. G. Wrightson

Associate

Paul Ebaugh	F. K. Johnston	R. D. Newhall
F. R. Healey	G. A. Howell	J. J. Reilly
J. C. Carmark	E. Mauldin	R. P. Smith
C. B. Durgin		

Student

J. M. Andrews	E. J. Hudecek	B. Menin
D. O. Bozeman Jr.	E. Hungerford	Harold Nass
W. L. Carter	W. L. Hunter	H. J. Seibold
C. M. Demarcay Jr.	Edw. Izmirian	J. C. Shore
	E. G. Jones	J. E. Spainhour
H. S. Gerry	F. D. Jones	N. Stetson
R. N. Golub	N. Kaback	F. W. Stott
Robt. Gow 3rd	W. L. Kratz	L. B. Thomas
Frank Hart	W. L. Langley	C. E. Walker
E. H. Hines	H. E. Lutz	F. H. Winter
J. A. Holder		

Respectfully submitted,

H. C. CHAPIN, *Secretary.*

APPLICANTS FOR MEMBERSHIP

Active

Dudley Cecil Andrews Jr.—Dyer, Whitestone Dye Works, Maspeth, L. I., N. Y. Sponsors: L. H. Winnell, C. C. Knights.

Robert H. Baker, Jr.—Supt. of Bleaching and Finishing, Mooresville Cotton Mills, Mooresville, N. C. Sponsors: W. L. Barker, John E. Bell.

John Garvan Cavanagh—Vice Pres., Cavanagh Hat Research Corp., South Norwalk, Conn. Sponsors: H. F. Herrmann, W. L. Braun.

Edgar Raymond Clark—Fellow, Mellon Institute, U. S. Hoffman Machinery Fellowship, Syracuse, N. Y.

Ralph H. Crisp—Dyer, Margate Hosiery Mills, Chattanooga, Tenn. Sponsors: W. K. Mobley, T. J. Marler.

James E. Doherty—Dyer, Penn Worsted Co., Philadelphia, Pa. Sponsors: R. M. Moore, D. McGowan Jr.

L. C. Elrod—Owner, L. C. Elrod Dyeing Co., Houston, Texas. Sponsor: D. S. Culberson.

Emil Firebaugh—Dye Foreman, Illinois Knitting Co., Mt. Vernon, Ill. Sponsors: P. F. Willgeroth, C. E. Maher.

Charles E. Foster—Salesman, Standard Chemical Products, Inc., Andover, Mass. Sponsors: J. N. Dalton, H. T. Rooney.

Frederick Daniel Frissell—Supt. Southern Dyers Div., Burlington Mills, Burlington, N. C. Sponsors: E. W. Klumph, J. B. Neeley.

Leland Frederic Gleysteen—Research Associate, AATCC, Brown University, Providence, R. I. Sponsors: R. A. Pingree, W. H. Cady.

John Henry Gormley Jr.—Sales Manager, Providence Branch, United States Dyestuff Corp. Sponsors: W. T. Oliphant, H. V. Morrell.

Carrol Martin—Supt. of Dyeing, Cramerton Mills, Cramerton, N. C. Sponsors: L. L. Baker, I. J. Royce.

George T. Moore—Salesman, Globe Dye Works Co., Philadelphia, Pa. Sponsors: R. W. Delaney, D. McGowan Jr.

C. H. Morris—Dyer, Wiscassett Mills Co., Albemarle, N. C. Sponsors: T. R. Smith, A. H. Gaede.

Carl R. Muegge—Proprietor, Master Dyeing Co., Long Island City, N. Y. Sponsors: L. H. Winnell, C. C. Knights.

Francis Edward Nevins—Salesman and Technical Demonstrator, Ciba Co., Inc., Philadelphia, Pa. Sponsors: W. A. Stringfellow, H. B. Dohner.

Frank Pelters—Dyer, Sidney Blumenthal & Co., Shelton, Conn. Sponsors: B. Fisher, D. Ferguson.

Roy Clyde Propst Jr.—Western Representative, Buffalo Electrochemical Co., Joliet, Ill. Sponsors: H. W. Tetzlaff, J. F. Feit.

W. C. Ragin Jr.—Salesman, American Aniline Products Inc., Columbus, Ga. Sponsors: A. R. Macormac, M. T. Johnson.

Frank J. Rizzo—Chemist, Arlington Mills, Lawrence, Mass. Sponsors: H. Christison, C. K. Nutting.

Francis J. Robertson—Chemist, Sagamore Color & Chemical Co., Boston, Mass. Sponsors: H. P. Selya, M. G. Dimon.

Robert Schaeffer—Dyer, Joseph Black & Sons, York, Pa. Sponsors: R. W. Delaney, A. P. March.

Solon P. Schwoyer—Salesman, E. F. Houghton & Co., Charlotte, N. C. Sponsor: R. D. Howerton.

J. Edward Smith—Chemist, E. I. du Pont de Nemours & Co., Technical Laboratory, Wilmington, Del. Sponsors: C. A. Seibert, H. C. W. Calcott.

Richard Hill Tuttle—Supt., Marshall Field Co., Leaksville, N. C. Sponsors: A. H. Gaede, T. R. Smith.

Peter T. Waltrich—Chemist, Penn Worsted Co., Philadelphia, Pa. Sponsors: R. M. Moore, D. McGowan, Jr.

William G. Ware — Dyer, Mooresville Cotton Mills, Mooresville, N. C. Sponsors: W. L. Barker, J. E. Bell.

Joseph A. Waring—In charge of Dyeing Dept., Van Raalte Co., Paterson, N. J. Sponsors: R. C. Horner, H. Wolf.

Junior

George W. Hall, Jr.—Salesman and Demonstrator, George E. Sherman Co., Inc., Hickory, N. C. Sponsors: H. G. Miller, L. W. Sherrill.

Alexander Hamilton McKenzie, Jr. — Asst. Dyer and Bleacher, Portland Woolen Mills, Portland, Oregon. Sponsors: R. Fitzgibbon, E. W. Pierce.

John H. McCarthy—Asst. Dyer, Hat Corporation of America, South Norwalk, Conn. Sponsors: H. F. Herrmann, W. B. Braun.

John Boyko—Textile Color Laboratory, Sidney Blumenthal & Co., Inc., Shelton, Conn. Sponsors: W. C. Lindsley, B. Fisher.

Armando Spadetti—Chemist, Apponaug Co., Apponaug, R. I. Sponsors: H. N. F. Schaeffer, G. H. Wood, Jr.

Henry Francis Munroe—Chemist, Apponaug Co., Apponaug, R. I. Sponsors: H. N. F. Schaeffer, G. H. Wood, Jr.

Harold M. Hillman—Laboratory Asst., Sidney Blumenthal Co., Shelton, Conn. Sponsors: W. C. Lindsly, F. Hallaman.

Harold Cecil Richardson — Textile Chemist, American Woolen Co., Shawsheen Village, Mass. Sponsors: A. Morrison, H. D. Grimes.

Harry Green—Chemist, Androscoggin-Bates-Edwards-Hill & York Mfg. Co., Lewiston, Maine.

Charles L. Glass—Asst. Dyer, Margate Hosiery Mills, Chattanooga, Tenn. Sponsors: F. F. Myers, T. J. Marler.

Associate

George C. A. Barbour—Supt. Pennsylvania Museum of Art, Philadelphia, Pa. Sponsor: R. M. Ritter.

E. Avery Bruce—Branch Manager, Ciba Co., Inc., San Francisco, Cal. Sponsors: R. Fitzgibbon, E. W. Pierce.

Samuel M. Cooper—Director of Standards, G. C. Murphy Stores, McKeesport, Pa.

Nelson Arthur Howard, Jr.—Salesman, Calco Chemical Co., Bound Brook, N. J.

Russell Williams Hunt—Dyer, Franklin Process Co., Philadelphia, Pa. Sponsors: W. S. Hamlen, Jr., J. P. Conaway.

William H. Kieffer—Sales Department, Calco Chemical Co., Bound Brook, N. J. Sponsor: R. R. Sleeper.

Michael Minowitz—Supt. of Dyeing and Finishing, Arcadia Knitting Mills, Allentown, Pa. Sponsors: A. E. Raimo, A. W. Edwards.

Frank Lewis Orrell—Supt. of Drawing and Spinning, Mass. Mohair Plush Co., Lowell, Mass.

William E. Wilson—Textile Expert, Pennsylvania Museum of Art, Philadelphia, Pa. Sponsors: H. B. Dohner, R. M. Ritter.

Charles L. Yoemans, Jr. — Salesman, Anheuser-Busch, Inc., Greenville, S. C. Sponsors: N. A. Johnson, T. R. Harris.

Student

Vernon W. Colby—Lowell Textile Institute. Sponsor: L. A. Olney.

David Kramer—Bradford Durfee Textile School. Sponsor: L. B. Coombs.

Samuel Levin—Lowell Textile Institute. Sponsor: L. A. Olney.

Herbert C. Olson—Lowell Textile Institute. Sponsor: L. A. Olney.

John Peter Ploubides—Lowell Textile Institute. Sponsor: L. A. Olney.

William B. Prescott—Lowell Textile Institute. Sponsor: L. A. Olney.

Walter F. Prien—Lowell Textile Institute. Sponsor: L. A. Olney.

Clyde B. Rountree—Lowell Textile Institute. Sponsor: L. A. Olney.

Thomas G. Sloan—North Carolina State College. Sponsor: A. H. Grimshaw.

Sidney G. Smith, Jr.—New Bedford Textile School. Sponsor: F. E. Busby.

Francis M. Southerland—North Carolina State College. Sponsor: A. H. Grimshaw.

Edward Spevack—Lowell Textile Institute. Sponsor: L. A. Olney.

Francis H. Walsh, Jr.—New Bedford Textile School. Sponsor: F. E. Busby.

ONE HUNDRED AND SEVENTH MEETING OF THE RESEARCH COMMITTEE

THE 107th meeting of the Research Committee followed the Council meeting in Boston on Friday afternoon, October 15, 1937. Present were Chairman Louis A. Olney presiding, W. D. Appel, K. H. Barnard, J. R. Bonnar, W. H. Cady, Hugh Christison, H. D. Clayton, C. Z. Draves, W. C. Durfee, Richard Haworth, H. F. Herrmann, E. H. Killheffer, Hans Meyer, W. R. Moorhouse, G. A. Moran, R. M. Ritter, W. M. Scott, Ben Verity, P. J. Wood, and H. C. Chapin, Secretary.

The Chairman reported on the progress and plans of the Research Associates, and publication of results in the newly instituted Research Quarterlies of the AMERICAN DYESTUFF REPORTER. Hugh Christison reported for his Committee on Determination of Extraneous Matter in Wool, stating that Mr. Ryberg's recent work had been devoted to the alcohol soluble residue left after extraction of wool with ether. K. H. Barnard, reporting for his Committee on Crease Resistance, stated that Herbert F. Schiefer of the National Bureau of Standards would publish a method of measuring crease resistance in November. H. D. Clayton, reporting for the Committee on Shrinkage, stated that work on cotton would be extended to wool and worsted, and expressed the hope that something on rayon would be published within a year. Describing the printed spots prepared for the Year Book to illustrate crocking standards, W. C. Durfee stated that these might be used too for rough standards of depth of shade in dyeings. He emphasized the need of borderline tests separating what would satisfy customers from what would not.

"Recommended Standards for Testing and Reporting Woven Dress Fabrics," prepared by the National Bureau of Standards, were discussed at length, especially with regard to terminology, which some members of the committee considered unfamiliar to the industry. W. D. Appel urged that descriptions of tests sponsored by the Association be made legally specific, stating that legal limits of acceptability of merchandise would be settled in the courts on the basis of custom rather than previous edict, but that custom would settle upon one of a series of clearly defined test limits as the borderline for acceptable merchandise. The Chairmen of the various committees on dye fastness were constituted a Fastness Terminology Committee under W. D. Appel, Chairman. Mr. Appel reported progress on the part of the Light Fastness Committee in agreement upon test standards acceptable to British, Germans and ourselves. G. A. Moran, discussing the British standards for washing fastness on cotton, stated that it would be fairly easy to reach a compromise, principally through temperature changes.

Respectfully submitted,

H. D. CHAPIN, *Secretary.*

MEETING, NEW YORK SECTION

THE first regular meeting of the New York Section for the 1937-38 season was held on Friday evening, October 22nd, at the Swiss Chalet, Rochelle Park, N. J., at 8 P.M. The usual informal dinner was held at 6:30 P.M. preceding the meeting.

Mr. Conrad Frye of the Maas and Waldstein Company, Newark, N. J., delivered an interesting paper on "Lacquer Printing" on textiles and in allied fields.

Mr. George W. Hinkle of the Republic Steel Corporation presented a motion picture dealing with the manufacture and uses of Enduro—the Perfected Stainless Steel in the textile field.

It was indicated at this meeting that it might be necessary to hold more meetings in New Jersey than in New York.

There was a total attendance of one hundred and ten (110).

Respectfully submitted,

P. J. KENNEDY, *Secretary.*

A. P. HOWES
Publisher

M. D. REESER
Advertising Manager

AMERICAN
DYESTUFF
REPORTER

LOUIS A. OLNEY
Directing Editor

NORMAN A. JOHNSON
Managing Editor

Published biweekly by HOWES PUBLISHING CO., INC., 440 Fourth Avenue, New York City.

Subscription Price: $5:00 *per year; Canadian,* $6.00; *Foreign,* $6.00. *Fifty cents per copy*

VOLUME 26 DECEMBER, 27, 1937 NUMBER 26

Season's Greetings To All*

A. P. Howes

Louis A. Olney

Myron D. Reeser

Norman A. Johnson

**We think this makes as appropriate an editorial as any at this time of year.*

Some Causes of Irregular Shades in

Hand Block Printing

T. C. HUTCHINS

IRREGULARITY and unevenness of shade is a fault which is sometimes encountered during the printing of fabrics by block. This irregularity may take the form of variation in shade from one delivery to another or it may be that the fault makes its appearance as unevenness during one particular run of prints. In either case the causes of the trouble may vary considerably.

In block printing as in all other classes of print the first essential is a clean material on which to produce the shades. If for any reason the cloth has been imperfectly desized the result will be unlevel prints. An instance of this may be found in the printing of linen fabrics which have been sized with starchy matters. Unless such material has been treated with diastatic bodies and carefully washed or scoured prior to printing it is impossible to produce good impressions thereon. Some coloring matters are more susceptible to the influence of sizes than others. For instance the use of alizarine dyestuffs on cloth which contains any proportion of starchy matter in the form of size will result in the production of very uneven and imperfect printing impressions. The principal reason for this is that the starch has itself a decided affinity for alizarine dyestuffs and this fact together with mechanical inhibition of the absorption of the print paste by the adhering starchy bodies, results in unevenness. Not only does starch resist the application of the colors named but every type of dyestuff, e.g., vats, azoics, chrome mordant colors, etc., are all affected more or less in the same manner.

The only way to avoid such trouble is for the printer to examine each delivery of cloth for printing in order to ascertain the type of size used. Starch is of course easily identified by spotting with iodine and its removal is a comparatively simple matter. The fault is sometimes likely to arise with material which has been delivered for printing in the finished state. This occasionally happens with handkerchief materials which are bought in the white state. The merchant may buy a particular lot of cloth from a weaver who already has such a lot made up, or finished white. This cloth is then passed on to the printer without comment and unless a test is made thereon the result may easily be as aforesaid. Cloth which has been printed under either of the aforementioned conditions may easily be recognized by the poor printing impressions. What actually happens is that a good deal of the dyestuff is washed off along with the surplus size, finish, etc. during the final after-treatments and the prints appear bare and scabby.

Unevenness in shade may also result from the employment of the wrong type of block for a particular pattern. As it is obvious that unevenness will appear more easily on a blotch or semi-blotch pattern than on one which does not show a large expanse of color. For the production of certain effects on heavy patterns it is sometimes necessary to use ordinary wooden blocks (plane wood, pear wood, sycamore, etc.) without any covering. Such a block does not lift so much color or lift it so easily as a block whose surface is covered with a layer of cotton material. The result is that in the former case the printer is more liable to lift color unevenly from his "sieve" and when such a block is laid on the printer's table the unevenness of the impression will be manifest. In order to remedy such defects it is necessary to use discrimination in the choice of thickening materials. For instance if the block is uncovered, bare wood, it will be necessary to use a more viscous thickening than if the block had a cotton cover. The reason for this is obvious in that the color prepared from the more gummy thickening will stick and spread more evenly on the surface of the bare wood than would a "softer" thickening, e.g., a mixture of starch and gum tragacanth.

Again it is the practice for printers to use some dry British gum along with a color that is not working too well in order to provide the extra "tackiness" or viscosity. Such a practice ought to be deprecated in any well-ordered print shop in consequence of the risk of unevenness of shade arising therefrom. For very dark shades printed on fine objects there is little objection to such a practice in moderation, but once begun by a discriminating printer it is likely to be carried on by others who are likely to abuse their liberty.

Perhaps a more frequent cause of unevenness of shade than is generally realized is the thickening medium. From the point of view of the printer the thickening is by far the most important part of the made-up print paste. Upon the thickening medium depends the sharpness, penetration and clarity of the printing impression and to a considerable extent the depth and brightness of the color itself when finished. It will sometimes be found that when a repeat of a particular pattern comés along that the shades of the second printing are lighter or perhaps fuller than the first printing. This at first sight may be blamed upon the color-

mixers but may really be the fault of the irregular composition of the thickening agent in use. Such a fault is more likely to arise from the use of British gum thickening than with another type, for the following reasons. Such gums are manufactured from starches by the process of converting part at least of the starch into soluble dextrins. The processes used are of course susceptible to control but in the procuring of the raw starch some difficulty may be encountered in maintaining a regular standard. It should nevertheless be the aim of the manufacturer to obtain in any particular quality or grade of gum a constant ratio of starch and dextrin, but in spite of all such efforts it will occasionally happen that the same quality of gum will contain more starch at one time than another. It is obvious that in the gum which contains the greater percentage of starch the shades produced will be stronger and vice versa. The safest plan for the printer is to test each delivery of gum by means of a practical print trial with a standard color and from that, make the necessary adjustments for repeat printings.

With regard to the production of impressions which show unevenness of appearance during the same run the thickening may here be also to blame. As just described the production of certain types of gums depends upon the conversion of a proportion or all of the starch into dextrin which is soluble. If the process of conversion is not thoroughly carried out there may remain a considerable portion of insoluble matter in the thickening agent. This insoluble remnant may easily give rise to unevenness in the following manner:—When the printer saturates the sieve with color in order to furnish the surface of the block, a good deal of the aforementioned insoluble thickening matter is transferred to the sieve. This will gradually accumulate both on the sieve and on the surface of the block, until in time the printing impression may become unlevel. The unevenness in this case takes the form of a dark blotchiness near the center or heaviest portions of the block. It is due probably to the accumulation of coloring matter as a result of the presence of a larger amount of the thickened print paste at the portions involved. Again it may partly be the result of the production of a darker shade by the insoluble part and therefore the more starchy portion of the thickening, which would naturally give a darker shade. Sometimes long continued boiling of the thickening will remove the cause of this fault but more often than not such treatment has little or no effect on the composition of the print paste. One remedy which has been found to be effective in many instances is the introduction of a small portion of gum tragacanth to a print paste which is faulty in this respect. The effect of the tragacanth is to hold the insoluble portion of the thickening in suspension by reason of the colloidal properties of the tragacanth mucilage. It will be found that a thickening treated in this manner does not produce an insoluble deposit either on the sieve, the surface of the block or in the container. The insoluble matter is still there but it is held in suspension in such a manner that it no longer interferes with the printing impression.

Vat colors in particular are liable to the fault of unevenness of shades when printed by hand blocks in fairly heavy patterns. One of the main causes of this is the viscosity of the thickening. Such thickenings are usually made from a mixture of starch and gum and if the proportion of gum is fairly high in order to obtain a level impression the danger of the prints sticking to the back-grey is likely to arise. The printing foundations on a block printing table consist of a bottom layer of woolen blanket on top of the concrete foundation. The woolen blanket is then covered with an old piece of back-grey which in turn is covered with one or two layers of clean back-grey. The cloth is spread on the top layer of back-grey which acts as an absorbent of the surplus color which is forced through the material during the operation of printing. When in the case of heavy patterns a good deal of print paste is thus transferred to the grey the prints produced will stick to the grey when dry, at those parts where the color has penetrated most. It is obvious that if certain portions of the print are in such close contact with the grey as to stick when dry, then those portions will have absorbed from them by the grey a correspondingly large proportion of print paste. The final result in such cases will be that part of the prints on any one table will retain much more color than the others. Sometimes the fault in these cases will take the form of streakiness, at other times cloudiness will result but whatever the appearance the cause is the same. The remedy is to manipulate the block so that the prints do not stick to the back-grey. This requires some degree of skill on the part of the printer but it is possible to operate in this fashion by lifting the block after each laying, with a sudden movement so that the whole of the portion of the cloth is lifted clear of the grey. As the only type of pattern on which this fault is liable to appear is the single color blotch, printed on light handkerchief materials there is not much difficulty in applying the remedy outlined.

The sieve on which the printer dips his block in order to furnish the block with print paste is also a potential cause of unevenness of shade. Upon the type of sieve in use depends to a large extent the sharpness, levelness, etc. of the impression produced. Not only so but the furnishing of the sieve with print paste may also be at fault. In the early days of block printing each printer had a small boy or a girl whose duty it was to keep the sieve supplied with print paste during printing operations. The printer was therefore at liberty to concentrate as much as possible on the production of his impressions. Nowadays most print shops expect the printer to furnish his own sieve, to which practice there is really no very valid objection, except that in fast working the printer may be inclined to pay rather less attention to the sieve than he ought. The result of such lack of attention may well be that unevenness will arise due primarily to the uneven film of print paste spread upon the surface of the sieve by the printer. When it is considered that the whole surface of the sieve should be covered with an even film of print paste in order to in-

sure the conveyance of the color to the fabric in a similar manner, it may readily be conceived that a badly furnished sieve will give rise to faulty printing impressions.

Even with well furnished sieve the printer may still be at fault in the dipping of his block upon the sieve. In order to overcome the latter tendency the printer should turn his block upon his hand at least once during the dipping action. The block should be dipped once, then turned on the heel of the hand for the second dip before being applied to the cloth for the printing impression.

Difference in the degree of pressure during printing may also result in irregularity of shade. Difference in pressure may arise from an uneven surface on the printing table or from faulty manipulation by the printer. If there are hollow places on the table the result will be that more color is left on the cloth at the hollow portions than at the level places, with the production of corresponding irregularities of shade. With regard to the application of pressure by the printer, some degree of difference is bound to occur, but it is only when pressure becomes excessive that the difference is seen in the shades produced. Vat colors are more susceptible than any other type to this fault and when printers resort to the use of heavy "mauls" or leaden mallets, as they often have to do, for the production of well penetrated prints the result is, very often, weak colors at the portions which have been subjected to the greatest amount of pressure. One probable reason for the more frequent incidence of the fault with vat colors is the insoluble nature of these dyestuffs in the form of their print pastes. Most other dyestuffs in the print paste form are in a soluble condition and are therefore the more easily retained by the fabric. Vat dyes on the other hand having no affinity whatever for the cloth, in the insoluble condition, are forced right through the material as the result of excessive pressure and so the fault of weak shades may easily arise. For prints therefore which are required to be well penetrated with vat colors it is of importance to assist the print paste as much as possible by the use of a proportion of gum tragacanth in the thickening or the application to the color of some of the well known assistants for this purpose. Products with a glycerine basis and soluble pine oils may prove valuable in this respect.

TRADE NOTES • NEW PRODUCTS

PAUL F. HADDOCK

Paul F. Haddock, Southern Sales Manager of American Cyanamid & Chemical Corp., died at his home in Charlotte, N. C., on Sunday, December 5th. He was 51 years old.

Mr. Haddock was born in England and came to this country when a young man. After spending some time in the northern and eastern sections of the country engaged in mill work he moved to the South and became very well and favorably known to men of the textile industry of that section. Prior to his connection with the American Cyanamid & Chemical Corp. he was manager of the Southern District of A. Klipstein & Co. for 19 years. He was an active member of the American Association of Textile Chemists and Colorists and had, at various times, held office in that association.

He is survived by his widow and one son, Paul F., Jr.

• HAAS-MILLER EXPANDS

The Haas-Miller Corporation, Fourth and Bristol Streets, Philadelphia, will take over the entire business of Chas. J. Haas, Inc., as of January 1st, 1938. The surviving company has made great strides within the last two years. They also announce the recent appointment of Mr. R. K. Gurney as New England Sales Manager. Mr. Gurney is well known throughout the trade.

• MICROMAX CATALOG

A new 32-page illustrated catalog on "Micromax Temperature Instruments for the Steam Plant" is offered to executives, engineers and operating men concerned with steam generation . . . whether in central stations or industrial plants. It shows how temperature measurements help to effect important operating economies. It describes three methods of measurement: (1) the thermocouple pyrometer, used for most steam-plant temperatures; (2) the resistance thermometer, recommended for low temperatures; (3) the optical pyrometer which measures temperatures within the furnace. Lastly, it presents Micromax indicators, recorders, controllers and accessories usually chosen for steam-plant use.

To receive a copy, ask Leeds & Northrup Company, 4934 Stenton Avenue, Philadelphia, Pa., for Catalog N-33-163.

• COWLES EXPANDS

Industries served by the Cowles Detergent Company will be interested in an announcement by that progressive concern of important corporate and executive personnel changes which have recently been made effective.

Several subsidiary and affiliated companies have been merged with the parent company under the title of the Cowles Detergent Company. Included in the merger is the Mitchell Wing Company of Cambridge, Mass., which will, in future, function as a division of the Cowles Detergent Company. Other companies will be added to the group later.

Mr. E. S. Bassett, President and General Manager for many years, is planning to retire from active management of the business and, at the annual meeting of the company next Spring, he will be succeeded by Col. Aaron L. Mercer, who has recently joined the Cowles organization as Executive Vice-President. Mr. Bassett will, at that time, become Chairman of the Board and will continue as a director, retaining contact with company affairs in an advisory capacity.

Col. Mercer has had a broad business experience and comes to the Cowles organization with a fine reputation for administrative ability and resourcefulness. For a number of years, and until recently, he was President and General Manager of the Vulcan Corporation of Portsmouth, Ohio, in which position he made an enviable record. His headquarters will be in Cleveland.

The personnel of the merged companies in the Cleveland and division offices and in the field will be continued and will be augmented as occasion requires. The

same Cowles field men will call on the trade as heretofore, and the same efficient service laboratory at Cleveland will be available to help Cowles' customers solve their technical difficulties.

The management of the expanded Cowles Company is formulating comprehensive plans to broaden the scope of its activities and increase its usefulness to the industries which it serves. A research laboratory, with increased facilities, will be at work developing new products and fitting the entire Cowles line into a wider use by laundries, textile mills, metal cleaners, dairies and other industries. The Cowles Detergent Company has always been progressive, and it is planning to become even more so.

• WITH ANHEUSER-BUSCH

Elwyn B. Clancy, in charge of the corn products sales in New England for Anheuser-Busch, Inc., has recently added the coverage of the textile field in that section to his duties. Mr. Clancy has been

Elwyn B. Clancy

located in New England for the past fourteen months where he has been contacting the confectionery and bakery trade. He will now devote considerable time to the textile industry in the promotion of the Anheuser-Busch line of starch, British gum and corn syrup products.

• DYESTUFFS

The December, 1937, issue of *Dyestuffs*, quarterly publication of the National Aniline & Chemical Co., Inc., 40 Rector Street, New York City, has recently been distributed. Among the articles contained in this issue are found these described by the following titles: A Good Old Custom: National Nacconol N R, Some Practical Application Formulas in the Textile Industry; Coating with Acetate (Concluded from September issue); Vegetable and Animal Substances in Dyeing, Cleaning and Washing; Spots in Textiles: Their Causes, Prevention and Removal; The Use of Naphthol As Dyestuffs for Printing; Applications of Colorimetry in the Dyeing and Allied Industries. Copies of this publication are available upon request.

• CORROSION DATA

The International Nickel Co., Inc., 67 Wall Street, New York, N. Y., has distributed a booklet entitled "400 Practical Applications for Monel, Nickel and Inconel Under Corrosive Conditions." An introduction to the booklet states: "In attempting to describe the usefulness of a material in resisting corrosion, it is possible to set up lists of chemicals which the material will resist satisfactorily and others that it will not resist. Such lists are often based on results of laboratory corrosion tests which have limited practical application and which, therefore, may be misleading. As a substitute for such a list we have compiled the tabulation presented herewith which is based on actual, practical application of the materials and which, therefore, can be used as a reliable guide in their selection for similar service." Copies of this booklet are available upon request.

• ANNOUNCEMENT

Effective immediately, General Naval Stores Company, Inc., a wholly owned subsidiary of Newport Industries, Inc., has ceased business activities and will be dissolved presently, all its assets and liabilities being transferred to Newport Industries, Inc. Business is being continued under the name of General Naval Stores Division, Newport Industries, Inc. There will be no change in the personnel, the dissolution being solely for the purpose of simplifying the corporate structure.

• JOINS A. D. LITTLE

Mr. Dexter North, Chief of the Chemical Division of the U. S. Tariff Commission and in charge of the annual Census of Dyes, has resigned to become associated with Arthur D. Little, Inc., research chemists and engineers of Cambridge, Mass., as their Washington technical representative.

In his new work Mr. North will continue to obtain and assemble technical, economic, and statistical information concerning the chemical and other process industries from the many active sources at Washington. Through his present association, however, similar investigations will be made directly for industrialists, as a part of the technical investigations made by the Little laboratories for their clients.

The appointment of Mr. North to this post results from the steadily increasing extent to which the Little laboratories have found it necessary to draw upon the technical resources of the many government bureaus, scientific societies, and trade associations whose activities are centered in Washington, as a part of technical investigations for American industrialists and investment bankers.

• CALCO CALENDAR

Because of the enthusiasm aroused by its movie, "Beyond the Rainbow," the Calco Chemical Company has commissioned Marius Hubert-Robert to make an oil painting of Victoria Falls, Africa, for the annual calendar. Those who have seen the movie will remember that the final scene shows a beautiful rainbow with the magnificent Victoria Falls in the background. It is this colorful scene that M. Hubert-Robert is painting.

Marius Hubert-Robert is a well known French landscape painter, being the fourth generation of a famous family of artists. He is the great grandson of Hubert-Robert, the famous 18th Century artist who organized the Louvre Museum. He, himself, has traveled all over the world and was commissioned by the French Government to paint scenes in the French Colonies. While in Africa for the French Government, M. Hubert-Robert saw Victoria Falls and sketched it. It is from his sketches that he is now painting Victoria Falls for the 1938 Calco calendar.

• NEW CHEMICALS AT EXHIBIT

"Aridex" water repellent was among fourteen products of E. I. du Pont de Nemours & Company, Inc., selected by the American Chemical Society for its exhibit of about 100 new developments at the 16th Exposition of Chemical Industries, held at Grand Central Palace, New York City, December 6-11.

The product was described as "a recent development by du Pont chemists, which can be applied to fabrics to render them water resistant, and spot and stain resistant. It covers the individual fibers of the cloth with an invisible film, yet permits normal, healthful circulation of air. It does not affect the appearance, handle or feel of fabrics; in many cases it improves the finish and tends to prevent the running of colors. The treated fabrics will remain water repellent through several careful launderings."

A group of four polymeric methacrylate resins, developed by du Pont, earned a place in the showing. These resins, it was explained, have a wide application to general industrial work in the form of coating compositions and binding and stiffening agents. The uses of these resins include the lamination of cloth; stiffening of paper, cloth and felt; as a resistant to oils, water, alkalies, and for other purposes.

The products on view in the American Chemical Society's exhibit were all introduced commercially since the 15th Exposition of Chemical Industries two years ago. They were selected as a result of a survey of the industrial chemical industry, and are regarded as outstanding in their several fields.

• CIBA REVIEW

The third number of *Ciba Review* has recently been distributed. This issue concerns itself with the subject of wall coverings. Among the contents are the following articles: The History of Mural Hangings; Wall-papers; Birds and Beasts in Wall-paper Patterns; The History of Wall-papers in England; Modern Wall-paper Manufacture; Historical Gleanings. A supplement distributed with this issue is entitled "Auxiliary Products for the Textile Trade." Copies of this publication are available upon request to the Ciba Company, Greenwich and Morton Streets, New York, N. Y.

• INSTALLING EQUIPMENT

The Gaston County Dyeing Machine Co., Stanley, N. C., is installing a twin kier dyeing machine and is also furnishing package carriers and other auxiliary equipment at the plant of the Mooresville Cotton Mills, Mooresville, N. C.

• GENERAL RELEASES

General Dyestuff Corp., 435 Hudson Street, New York, N. Y., announces release of the following circulars:

Diazo Bordeaux 7B Extra Conc.—a product, which when diazotized and developed with Developer A, produces full shades of a bluish bordeaux said to have good fastness to washing, very good fastness to acid, alkali and good fastness to light. Circular G-166.

Diazo Brilliant Scarlet 5BLN Extra—a product which, when diazotized and developed with Developer A produces clear bluish red shades on cotton or rayon said to be of very clear dischargeability with both neutral and alkaline discharge pastes. The product is said to be easily soluble and therefore recommended for machine dyeing. It is further said to level well, to be fast to storage, to produce good tone-in-tone effects on rayon and cotton and to be useful for silk. It is recommended by the manufacturers for coupling with Nitrazol CF, producing distinctly yellower shades than when diazotized and developed with Developer A. Circular I.G. 1406.

• STAINLESS STEEL EXPOSITION

Stainless steel equipment for textile fabrication and dyeing is included among the many types of products on display at the Stainless Steel Exposition that has recently opened in the New York Museum of Science and Industry, RCA Building, Rockefeller Center, New York City. This exhibit, which is sponsored jointly by Electric Metallurgical Company, Unit of Union Carbide & Carbon Corporation, New York, and the Museum, will be open every day from 10 A. M. to 10 P. M.

Every aspect of stainless steel—its history, development, production, fabrication, and uses—is portrayed in a comprehensive, interesting and educational manner. The display includes hundreds of stainless steel products for use in practically every conceivable field, which were sent to the exhibit by fabricators from all over the United States. Among these products are stainless steel textile fabricating and dyeing equipment; such as rotary dyeing machines, dye racks and sticks, bleaching kiers, propellers, valves, spools, and tubing.

The display of stainless steel products is supplemented by numerous operating displays which the visitors may work themselves, motion pictures, illuminated transparencies, and demonstrations showing why stainless steel is an important contribution to mankind and to various industries.

The industrial part of the Stainless Steel Exposition that has just opened in the Museum of Science and Industry, RCA Building, Rockefeller Center, New York.

Interesting demonstrations showing the superiority of stainless steel to ordinary steels include tests with various kinds of acids, such as acetic, lactic, and nitric, on both stainless and ordinary steels. Other tests include salt spray tests and heating to elevated temperatures. Operators give actual demonstrations of oxy-acetylene welding stainless steel and the "Shotweld" system of joining stainless steel.

The various steps in the production and fabrication of stainless steel are made clear by motion pictures, specimens, and interesting talks.

The part of the exposition devoted to metallurgy shows the importance of chromium in stainless steel, and how modifying additions such as nickel, molybdenum, copper, or columbium, are of advantage. The exposition is arranged in logical order to give the entire story of stainless steel so that it is understandable to the non-technical observer.

CLASSIFIED

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

POSITION WANTED: Finishing plant chemist desires responsible position. Expert on vats, napthols and other cotton and rayon dyeing. All types of control work and testing. 26 years' experience on yarn and piece goods. Write Box No. 993, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED: Plant Superintendent. Formula dyeing and scientific control assure strict economy with uniform matching, minimum returns and definite low costs. Nine years' experience processing rayon, acetate-rayon, mixtures, weighted and pure dye silks. Formerly chemist and superintendent of dyeing in large dyehouse. College graduate. Married. Territory immaterial. Write Box No. 995, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED: Expert Dyer. Rayon Silk Acetate Piece Goods. Jig Reel and Padding machines. Twenty-five years' practical experience. Will go anywhere. Write Box No. 997, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED: Unusually attractive proposition is offered to an experienced salesman with ready contacts in the East by a very progressive and growing textile chemical manufacturer with a varied line to meet any textile requirement. More recently a number of outstanding products have been created for the silk hosiery field. Write Box No. 988, American Dyestuff Reporter, 440 Fourth Ave., New York, New York.

To all Readers of the Reporter

The Second Annual Processing Review Number of the American Dyestuff Reporter was the largest ever published and the complimentary comments received thereon from our readers were indeed most gratifying.

The success of this issue prompts us to present the following interesting facts:

The cost per page to the advertisers who used over 71 pages in this issue was the same as it was in 1920, seventeen years ago.

In 1925, when the American Association of Textile Chemists and Colorists had been in existence five years, the total membership was 822. Today there are over 2000 members.

In 1920 the circulation of the Reporter barely exceeded 1000 copies. Today it is over 3100, yet the advertising rate has never been increased.

Printing and paper prices have advanced tremendously during this period and practically all of our competitors have, at one time or another, found it advisable to increase their advertising tariffs. We, on the other hand, have endeavored—and, thus far, successfully—to meet advancing costs through increasing the number of our advertisers and the amount of space sold to each.

We take this opportunity of expressing our appreciation of the part our advertisers have played in making it possible for us to improve the Dyestuff Reporter without increasing our advertising rates, and we assure you of our continued cooperation in endeavoring to make your advertising expenditure a definite factor in sales promotion.

We hope that, when possible, our readers will consider favorably those companies who for years have consistently brought their products to your attention through their advertising in the Dyestuff Reporter.

Publisher.

American Dyestuff Reporter, Vol. 26, No. 26, December 27, 1937. Published every other Monday. Copyrighted, 1937, by Howes Publishing Co., 440 4th Ave., New York, N. Y. Domestic subscription, $5.00; Canadian, $6.00; foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

GARDINOL*

REG. U. S. PAT. OFF.

Makes flower prints "Garden-Fresh"

Fatter pay checks mean fatter pocketbooks —more money to buy better things, better quality silks and rayons. More and more women are insisting on getting the best—in fabrics and in colors!

GARDINOL, with its gentle, thorough, cleansing action, has less tendency to bleed sensitive colors than ordinary soap. Alkalinity is completely eliminated in the soaping, producing truer colors, clearer whites, more beautiful fabrics—and greater sales! And all at no increase in cost.

A representative of any of the sales agents listed below will be glad to explain more fully how you can produce better fabrics by using a better cleanser —GARDINOL.

GARDINOL CORPORATION, GENERAL OFFICES, WILMINGTON, DELAWARE

SALES AGENTS

Procter & Gamble, Cincinnati, Ohio

National Aniline & Chemical Co., Inc., N. Y. C.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware

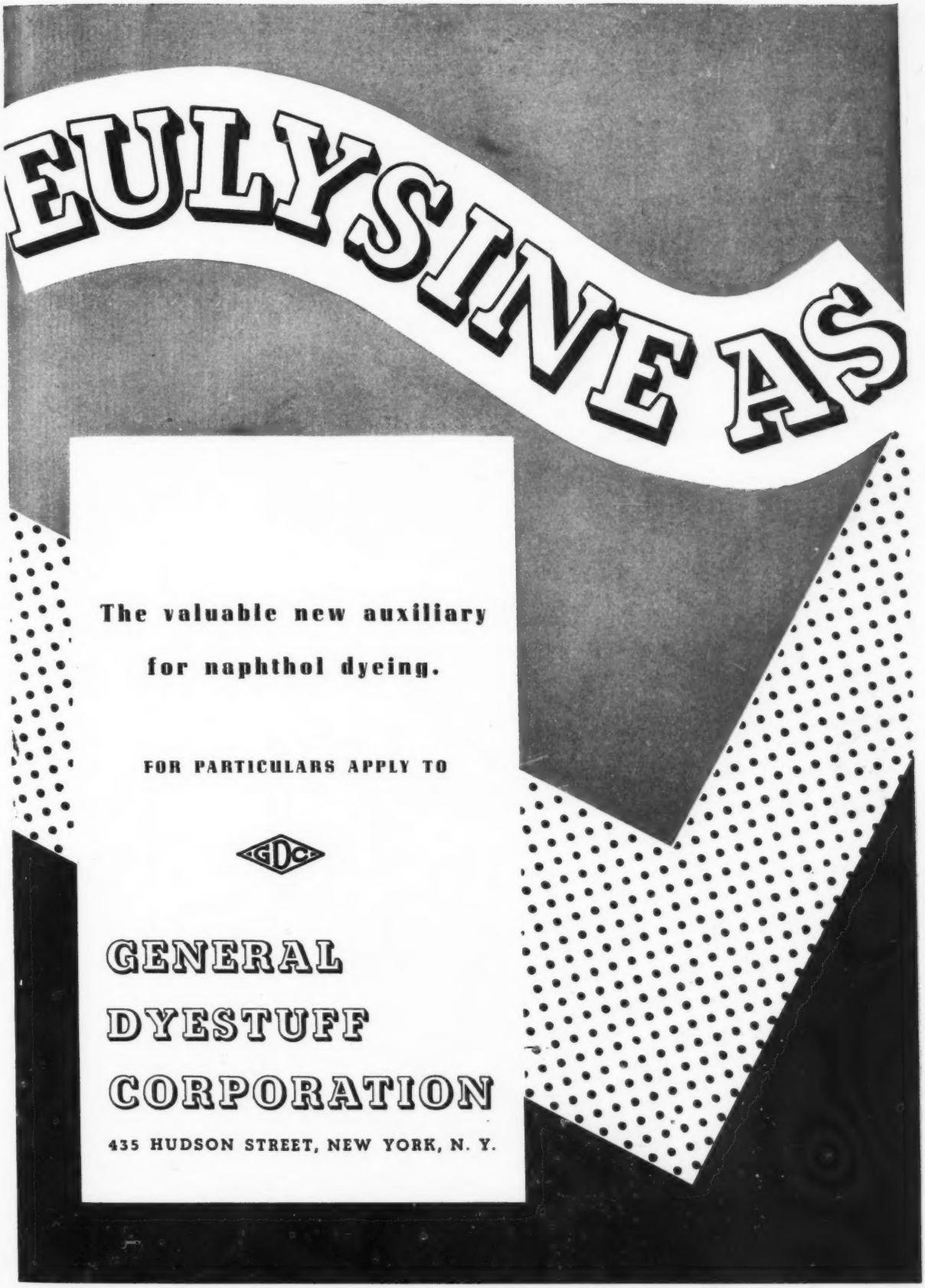
***GARDINOL WA**

***GARDINOL LS**

(*Patented)

AVAILABLE IN BOTH FLAKE AND PASTE FORM

"Gardinol" is the registered trade mark used by the Gardinol Corporation to designate its sulfated higher alcohols.


EULYSINE AS
The valuable new auxiliary
for naphthol dyeing.
FOR PARTICULARS APPLY TO
GDC
GENERAL
DYESTUFF
CORPORATION
435 HUDSON STREET, NEW YORK, N. Y.

NATIONAL

Sulphur Dyes ON STAPLE RAYON

A complete line of Sulphur Colors on stock dyed staple rayon possessing the required fastness for spun rayon blended with wool. • A copy of Color Card No. 222 showing this distinctive line is available through our nearest branch.

NATIONAL DYES

NATIONAL ANILINE AND CHEMICAL COMPANY, Inc.
40 RECTOR STREET NEW YORK, N. Y.

BOSTON . . . 150 Causeway St.
PROVIDENCE . . 15 Westminster St.
CHICAGO . . . . 357 W. Erie St.
PHILADELPHIA . 200-204 S. Front St.
SAN FRANCISCO . . 517 Howard St.
CHARLOTTE . . 201-203 W. First St.
GREENSBORO Jefferson Standard Bldg.
ATLANTA . . . . 140 Peachtree St.
CHATTANOOGA . . . James Bldg.
PORTLAND, ORE. 646 N. Thompson St.
TORONTO . . 137-145 Wellington St., West

BRANCHES AND DISTRIBUTORS THROUGHOUT THE WORLD

Providence Drysalters rayon throwing oils are considered superior for best results in crepe finishes. These oils are of highest quality and uniformity. They are reliable.

We also have no hesitation in recommending Providence Drysalters sulphonated oils for rayon finishing. Years of experience* and extensive research and manufacturing facilities enable us to produce the best. Write for information and samples.

*Providence Drysalters has been manufacturing sulphonated oils since 1894.

PROVIDENCE DRYSALTERS DIVISION
HERCULES POWDER COMPANY
INCORPORATED
Hospital Trust Bldg., PROVIDENCE, R. I.

PMT-13

Branches and Warehouses:

BOSTON — PHILADELPHIA — PROVIDENCE
CHICAGO — BURLINGTON, N. C. — CONCORD, N. C.
Plant: NEWARK, N. J.

Glamor

WITH FINE FABRICS, as with women who wear them, glamor starts with the finish. Your cloth may be woven of the finest materials and with the utmost skill...but its final appeal depends on its processing.

You can always be sure that Avitex finishing agents will bring the utmost in beauty to your fabrics. There are Avitex finishes for cotton, linen, rayon...to produce far superior soft and full effects, rich, silky or glossy...*at no increase in your present finishing cost.*

All Avitex finishes, of course, are proof against air oxidation...with never any danger of yellowing, rancidity or unpleasant odor even after long periods of storage. For technical information on this outstanding line of finishing agents, just write our nearest office.

DU PONT

AVITEX

REG. U.S. PAT. OFF.

TEXTILE FINISHING AGENTS

E. I. DU PONT DE NEMOURS & CO., INC., FINE CHEMICALS DIVISION, WILMINGTON, DELAWARE

SALES OFFICES:

Boston, Mass., Charlotte, N. C., Chicago, Ill., New York, N. Y., Philadelphia, Pa., Providence, R. I., and San Francisco, Calif.
Represented in Canada by Canadian Industries Limited, Box 1260, Montreal, Quebec, and 372 Bay Street, Toronto, Ontario.

Important Trade Notes

Indigosols

Additional Feature of Yellow V Is in Its Suitability for Both Padding and Printing

INDIGOSOL YELLOW V is a soluble, vat color ester salt, giving bright greenish shades of yellow with good all-round fastness. Special attention is directed to the fact that this product is also suitable for both padding and printing.

Used with INDIGOSOL GREEN IBA, or with any of the INDIGOSOL BLUES, the YELLOW V economically produces extremely effective and highly desirable shades of green.

The ease of application, the perfectly level shades obtained, and the excellent penetration of heavy goods make INDIGOSOLS unusually valuable to the fast color dyer or printer.

Pharmasols

Incomparable for Fast Color Printing on Percales and Dress Goods

Because of their low cost and the brilliance of shades obtained in fast color printing on percales and dress goods PHARMASOLS are exceptionally valuable. Especial attention is directed to PHARMASOL YELLOW GN CONC., a pure green shade of yellow—clear, bright, and economical. Excellent as a self shade and of great utility in mixing with INDIGOSOL Green and Blues to produce yellow greens.

PHARMASOLS are solutions of stabilized azoic dyes and adjusted to the most practical concentration which can be easily applied with a maximum of efficiency.

PHARMASOLS solve the problem of troublesome dissolving and the uncertainties thereof—and as there is no decomposition there can be no loss of material or value.

CARBIC COLOR AND CHEMICAL CO., INC.

451-453 Washington Street, New York City

BRANCHES:
PHILADELPHIA HAMILTON, ONT.
PROVIDENCE
CHARLOTTE, N. C.

SOLE AGENTS FOR
DURAND & HUGUENIN S. A.
BASLE, SWITZERLAND

EXCLUSIVE DISTRIBUTORS OF
PHARMASOLS
PHARMOLS
PHARMACINES

The Supremacy of
PERKINS
CALENDER ROLLS
is the natural result
of the broadest
experience in the
textile industry
CALENDERS
ROLLING · CHASING · FRICTION
SCHREINER · SILK · CHARMEUSE
EMBOSSING
B·F·PERKINS & SON, INC.
ENGINEERS AND MANUFACTURERS
HOLYOKE·MASS
NO CALENDER
CAN BE BETTER
THAN THE ROLLS
IN IT

MAKES YOUR DYE DYE

TO make sulfur, direct and vat dyes do their best work, a true colloidally controlled alkali is necessary. This is the only means of so thoroly dispersing the dyestuffs as to secure level, non-streaky absorption and development of shade.

TEXTILE ESCOLITE

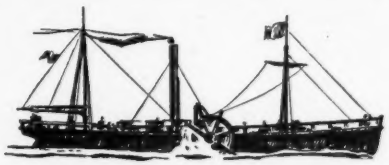
is the ideal source of the desired alkali-colloid

In water solution it yields a substantial amount of alkali under protective influence of colloids released at the same moment. More than an alkali. Unlike anything you have used. A strictly modern dyeing assistant that truly makes your dye dye.

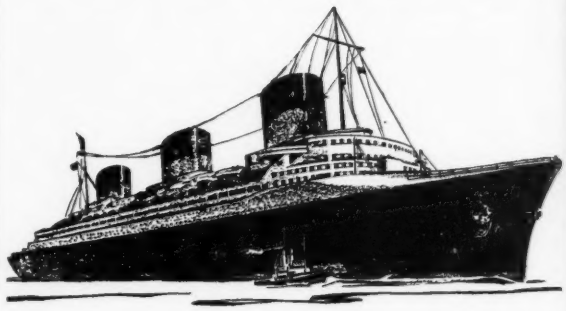
Full information gladly sent on request of

The **COWLES** DETERGENT COMPANY

10525 Carnegie Ave. :: :: Cleveland, Ohio



COLLECTIVE THINKING Made the Difference



Fulton HAD to play the lone wolf when inventing his first commercial steamboat, because most people thought him an impractical dreamer. Today the value of inventive genius plus COLLECTIVE THINKING is more widely appreciated and as a result we have achievements like the ocean liner Normandie.

Collective thinking also offers untold possibilities of progress in the sizing, printing and finishing of textile fibres. Furthermore, this type of thinking no longer is confined to large organizations, because A-H Consultation Service makes it available even to the smallest mill or department.

This service is rendered by a staff of specially trained chemists assisted by a completely equipped, modern laboratory and a company experience in all branches of the textile industry of 122 years.

Write to us at Providence about your sizing, printing or finishing problem, or talk with our local representative and let us make recommendations, free of all obligations.

Chemicals

Sizing and Finishing Gums and Compounds • Soluble Gums • Softeners • Soluble Oils Tallow • Waxes Soaps • Flour • Dextrines • Starches Pigment Colors and Lakes • Ammonia Acids • Blue Vitriol Borax • Bichromate of Soda • Bichromate of Potash Liquid Chlorine Chloride of Lime Caustic Soda (solid or flaked).

Arnold-Hoffman & Co., Inc.

Established 1815. *Plant at Dighton, Mass.*

PROVIDENCE, R. I.

NEW YORK BOSTON PHILADELPHIA CHARLOTTE

AS *Brilliantly Beautiful* AS

ONLY TITANOX PIGMENTS

CAN MAKE THEM

HERE is the "last word" in both discharge and lacquer print work. . . . If you wish brighter, clearer prints deep in cast, or sharper, cleaner patterns put the burden of producing them on Titanox pigments. They make the whitest whites, and pastel shades of exceptional beauty. In the formulation of discharge pastes and printing lacquers a minimum amount of Titanox pigment is required to give desired opacity, whiteness and brightness with the result that fabrics printed with them are free from a painty appearance, and their textures remain soft and smooth. Unusual permanence is another quality of prints produced with Titanox pigments.

These pigments also are most desirable from the fabric printers' standpoint because they are chemically inert, do not react, and blend perfectly with paste or lacquer.

TITANOX-A (Titanium Dioxide) • **TITANOX-B** (Titanium Barium Pigment)

TITANIUM PIGMENT CORPORATION *Sole Sales Agent*

111 Broadway, New York, N.Y.; Carondelet Station, St. Louis, Mo.; National Lead Company (Pacific Coast Branch), 2240 24th St., San Francisco, Calif.

TITANOX

TRADE MARK

ESTABLISHED 1895

BOSSON & LANE, Inc.

Manufacturers of

The Original

BLEACHING OIL

for boiling out Cotton, to produce a foundation for a Pure White

High Grade Sulphonated and Saponified

CASTOR OIL PRODUCTS

Para Soap Oil

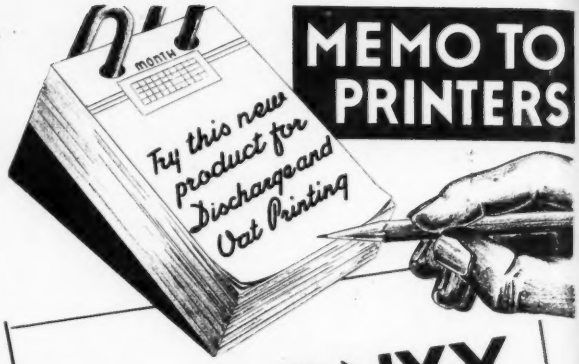
BINDOL

A superior binding agent for sizing and back filling

B & L Bleachers' Bluings and Violet Tints

Works and Office, ATLANTIC, MASS.

MEMO TO PRINTERS



HYDRONYX

(Sodium Sulphoxylate of superior manufacture)

Before placing any orders for your requirements, be sure to get full details on the following advantages of HYDRONYX.

• Clean • Pure White • Completely Soluble • Utmost Stability • 100% Strength • Forms—lump, pea size, rice size, powder.

WRITE TODAY *for representative to call with samples, details and prices. Demonstration on request.*

Onyx Oil & Chemical Co., Jersey City, N. J.

Specialists on Finishing Materials

New England Office: 100 Fountain St., Providence, R. I.
Midw. Repr.: Maher Color & Chemical Co., Inc., Chicago

Kali

MANUFACTURING COMPANY

(Manufacturing Chemists)

HYDROXY SIZES

IN

*DRY GRANULAR FORM

FOR

ACETATE

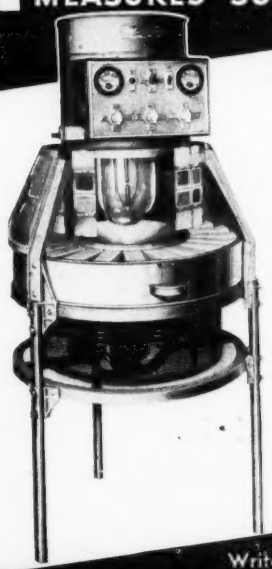
VISCOSE—BEMBERG

*HYDROXY FRENCH SIZE and HYDROXY ACETATE NO. 15 SIZE are still used very extensively by those who do not prefer Dry Sizes.

KALI 1410 N. FRONT ST., PHILADELPHIA

FADE-OMETER

MEASURES SUNLIGHT FADING



Fades Colors Like Actual Sunlight

Atlas Violet Carbon Arc - Nearest Known Duplicate of June Sunlight

Complete Cost of Operation Only 15 Cents per hour

Recommended by AATCC and National Bureau of Standards

Write For
22 Page Catalog

ATLAS ELECTRIC DEVICES CO.
373 W. Superior Street, Chicago

WAPACO PRODUCTS ARE SCIENTIFICALLY MANUFACTURED AND ABLY SERVICED

• OF PARTICULAR INTEREST TO PRINTERS

Available quantities of Ammonium Persulphate are at your disposal at Lowell Junction, Mass., awaiting your requirements.

• Wapaco Includes a Complete Line of Textile Chemicals

WATSON-PARK COMPANY

PROVIDENCE, R. I. TEL: HOPKINS 3022 • TORONTO, CANADA. TEL: MELROSE 3807

Main Office.
261 Franklin Street
Boston, Mass.

New England Agents
for
Bates Chemical Co.
Certified Food Colors

Factory:
Lowell Junction
Mass.

Sole Textile Distributors for
COWLES DETERGENT COMPANY, CLEVELAND, OHIO

CIBA

CIBACETES

that discharge and

CIBACETES

that print.

No saponification.

CIBA
COMPANY
INCORPORATED
NEW YORK
CIBA COMPANY, LIMITED
MONTREAL, P. Q., CANADA
Representing
Society of Chemical Industry in Basle,
Vat Dyes of the
Dow Chemical Company, Incorporated
OFFICES
IN MAIN TEXTILE CENTERS

FOR MASTER DYERS

LAUREL
SPLASHPROOF NO. 5
Boosts Hosiery Sales

Give your hosiery a Laurel Splashproof Bath and you give it rainy day protection . . . a sales advantage that will boost your sales.

Easily adapted to your present finishing process, Laurel Splashproof No. 5 gives its effective protection without the objectionable coating of the fibers. Equally effective on other fabrics.

Specify Laurel Splashproof No. 5 today

LAUREL SOAP MFG. CO., INC.
Wm. H. Bertolet's Sons
Established 1909
2604 E. Tioga Street Philadelphia, Pa.
Warehouses
Paterson, N. J. Chattanooga, Tenn. Charlotte, N. C.

2

WAYS TO ASSURE A BETTER BLEACH...

BECCO Hydrogen Peroxide and BECCO Technical Service are proven ways to improve the quality of your bleach and the saleability of your product. Let us demonstrate. No obligation, of course.

BUFFALO ELECTRO-CHEMICAL CO.
BUFFALO, NEW YORK
Boston • New York • Philadelphia • Chicago
Charlotte

The next

QUARTERLY RESEARCH NUMBER

will appear in our issue of

JANUARY 10th

PERMANENT FINISHES

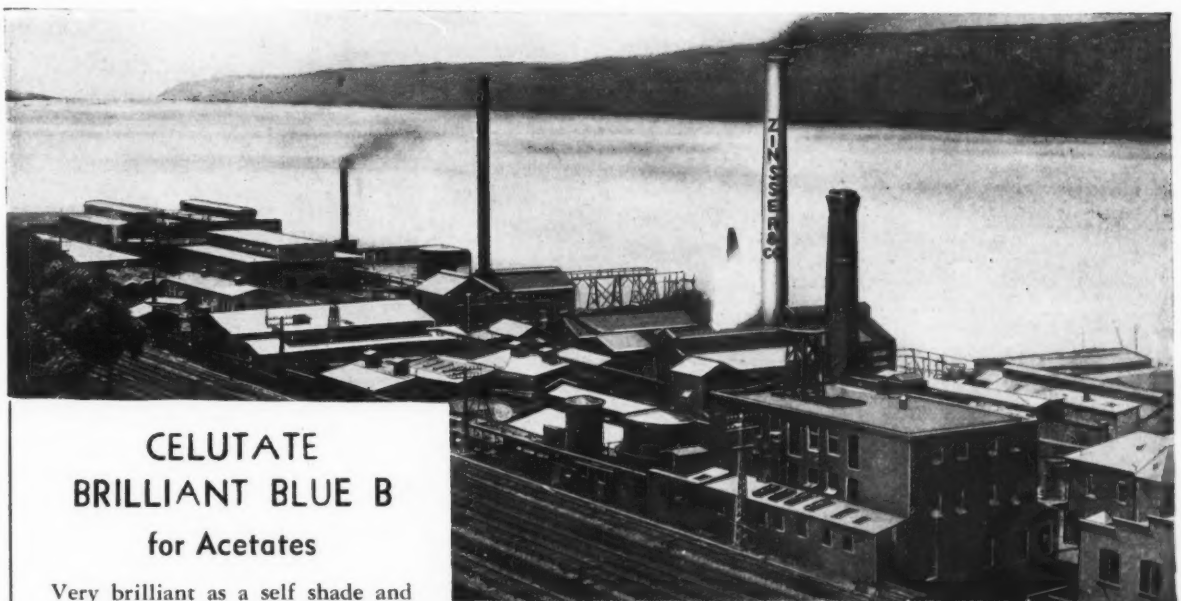
Hard or Soft Resins for Crisp or Mellow Fabrics

THE textile finisher has his choice of resins ranging from soft, tacky, viscous materials to those as hard and brittle as glass.

RHONITE *and* RHOPLEX RESINS in various modifications and combinations make available an almost unlimited number of permanent finish effects.

RÖHM & HAAS COMPANY, INC.

222 W. Washington Sq. Philadelphia, Pa.



CELUTATE BRILLIANT BLUE B

for Acetates

Very brilliant as a self shade and suitable as a base for bright greens.

Remarkable for its building up properties and its fastness to rubbing in heavy shades.

"CELUTATE"—Registered Trade Mark.

ZINSSER & COMPANY, Inc.

ESTABLISHED 1897

Manufacturing Chemists

HASTINGS-ON-HUDSON NEW YORK

DURING 1938

● THE AMERICAN DYESTUFF REPORTER WILL APPEAR ON THE FOLLOWING DATES ●

EVERY OTHER MONDAY

JANUARY . . .	10*-24
FEBRUARY . .	7-21
MARCH	7-21
APRIL	4*-18
MAY	2-16-30
JUNE	13-27
JULY	11*-25
AUGUST	8-22
SEPTEMBER . .	5-19
OCTOBER . . .	3*-17-31
NOVEMBER . .	14-28†
DECEMBER . .	12-26

*Quarterly Research Issue

†Annual Processing Review Number

PROCEEDINGS OF THE AATC&C

MANUFACTURERS

OF

DYESTUFFS

INTERMEDIATES

SULFONATED CASTOR OILS

BOIL-OFF OILS FOR HOSIERY

SPLASH PROOF FINISHES FOR HOSIERY

SOFTENERS

BICK & CO., Inc.

Reading — Pennsylvania

A full line of

DYESTUFFS AND ANILINE COLORS

Chemicals and Finishing Materials
for All Textile Purposes

Inquiries about Technical Problems Invited

FACTORIES:

CHEMICAL MANUFACTURING CO., ASHLAND, MASS.
NEW BRUNSWICK CHEMICAL CO., NEWARK, N. J.

NYANZA COLOR & CHEMICAL COMPANY, INC.

215 Water Street, New York City

— BRANCHES —

549 WEST RANDOLPH ST., CHICAGO, ILL.
115 SOUTHWEST FOURTH AVE., PORTLAND, ORE.
NEW ENGLAND OFFICE, ASHLAND, MASS.
635 DREXEL BUILDING, PHILADELPHIA, PA.
911 NORTH 6th AVE., KNOXVILLE, TENN.
JOHNSTON BLDG., CHARLOTTE, N. C.

The Result . . .

—Better Textile Printing!

SOLVAY

TRADE MARK REG. U. S. PAT. OFF.

POTASSIUM CARBONATE LIQUOR

(47% K_2CO_3)

Efficient, economical to the last drop . . . no extra mixing . . . no straining . . . no time wasted . . . a quality product without sludge or sediment. Comes in beautifully clear water-white solution ready for use. Write for prices and further particulars on this product today.

CAUSTIC SODA

SOLID • GROUND • FLAKE • LIQUID

Users of Solvay Caustic Soda have been receiving a standard product . . . a uniform, full strength product . . . since 1881.

Experienced users will testify to its excellent performance in the various textile operations in which it is required. Because Solvay Caustic Soda is manufactured under the highest degree of technical supervision . . . the latest scientific methods, you are assured of the finest textile results.

SEND FOR INFORMATION ON

Soda Ash • Caustic Soda • Ammonium Chloride
Liquid Chlorine • Textile Sodas • Sodium Nitrite
Calcium Chloride • Causticized Ash • Caustic Potash
Ammonium Bicarbonate • Ortho-dichlorobenzene
Para-dichlorobenzene • Salt • Potassium Carbonate

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

40 RECTOR STREET NEW YORK

BRANCH SALES OFFICES:

Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Indianapolis, Kansas City, New Orleans, New York, Philadelphia, Pittsburgh, St. Louis, Syracuse

Index to Advertisers

American Aniline and Extract Co., Inc.
American Aniline Products, Inc.
American Cyanamid & Chemical Corp. ..... Second Cover
Arabol Mfg. Co.
Arkansas Company
Arnold-Hoffman & Co. XIV
Atlas Electric Devices XVI
Bick & Co., Inc. XXI
Bischoff Co., Ernest
Blickman, Inc., S. XVI
Bosson & Lane, Inc. XVIII
Buffalo Electro-Chemical Co. XVIII
Butterworth & Sons Co., H. W.
Calco Chemical Co. XII
Campbell & Co., John VIII
Carbic Color & Chemical Co. X
Carbide & Carbon Chemicals Corp.
Ciba Company, Inc. XVII
Colgate-Palmolive-Peet Co.
Commonwealth Color & Chemical Co.
Cowles Detergent Co. XIV
Du Pont de Nemours & Co., E. I.
Fine Chemicals Division IX
R. & H. Chemicals Dept.
Franklin Process Co.
Gardinol Corp. IV
Geigy Company, Inc. ..... Front Cover
General Dyestuff Corp. V
Hercules Powder Co.
Providence Drysalters Division VII
Houghton & Co., E. F.
International Nickel Co.
Kali Manufacturing Co. XVI
Laurel Soap Mfg. Co. XVIII
Mathieson Alkali Works
National Aniline & Chemical Co. VI
National Oil Products Co.
Nyanza Color & Chemical Co. XXI
Onyx Oil & Chemical Co. XVI
Perkins & Son, B. F. XIII
Procter & Gamble
Rohm & Haas Co. XIX
Royce Chemical Co. ..... Back Cover
Sandoz Chemical Works
Scholler Bros., Inc.
Solvay Sales Corp. XXII
Stein, Hall & Co., Inc. ..... Third Cover
Taylor & Co., Inc., W. A.
Thomas, Arthur H. Co.
Titanium Pigment Co. XV
Union Carbide & Carbon Corp.
U. S. Oil Co.
Van Vlaanderen Machine Corp.
Virginia Smelting Co.
Wallerstein Co., Inc.
Warwick Chemical Co.
Watson Park Co. XVII
Wolf & Co., Jacques
Young Aniline Works
Zinsser & Co. XIX
Zurn Co., O. F.

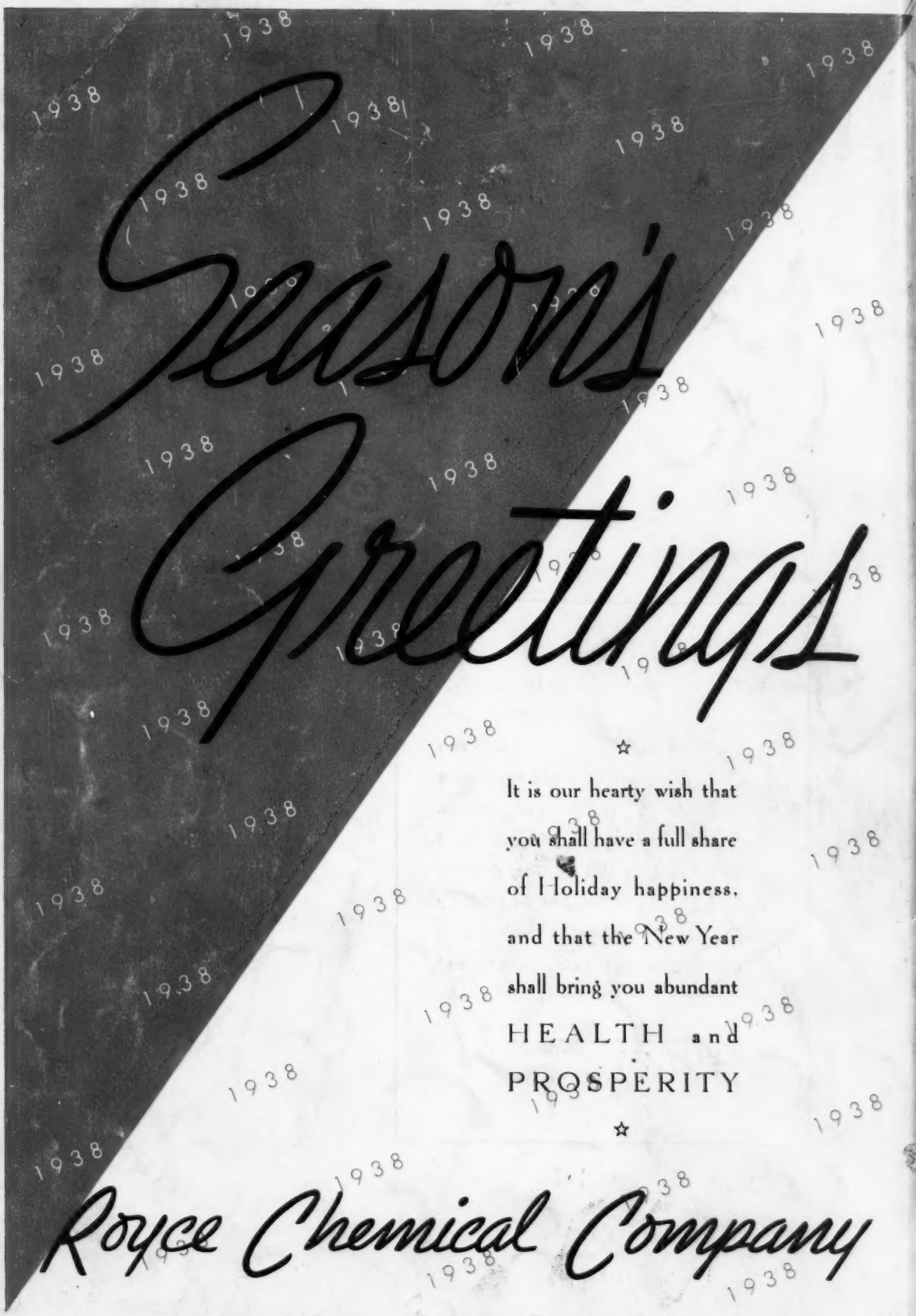
PASS THAT BALL

● When you pass your sizing, printing and finishing problems to the Stein Hall organization, you can be sure of the finest teamwork. Stein Hall laboratory experts and field men cre able to render useful and constructive aid in meeting your production requirements. For more than seventy years, the quality and uniformity of Stein Hall starches, dextrines and gums have contributed to the efficiency and economy of textile mill operations. Pass your problems on to this wideawake team at any time you're looking for effective results.

STEIN, HALL & COMPANY, INC.
285 Madison Avenue, New York

STARCHES, DEXTRINES AND GUMS FOR

SIZING · PRINTING · FINISHING


1938
Season's
Greetings
☆
It is our hearty wish that
you shall have a full share
of Holiday happiness,
and that the New Year
shall bring you abundant
HEALTH and
PROSPERITY
☆
Royce Chemical Company